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pt. 58

PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF

Specifications

RELATING TO

NAILS, RIVETS, BOLTS, SCREWS, NUTS, AND WASHERS.

A.D. 1618–1866.

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PREFACE.

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in future editions.

This volume contains Abridgments of Specifications to the end of the year 1866. From that date the Abridgments will be found in chronological order in the "Chronological

" and Descriptive Index " (*see* List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

The present series contains the inventions relating to the processes, machinery, and materials employed in the manufacture of nails, spikes, rivets, bolts, screws, nuts, washers, and treenails; including the various kinds of machines used in cutting nails, brads, &c. from the metal in its cold state, and machines adapted for cutting, forging, and shaping such articles out of heated plates, bars, and rods; also machines, apparatus, and appliances for cutting screws—forming screw threads and screw-blanks—cutting off and heading rivets and bolts—forging, forming, and punching nuts and washers, railway spikes, pins, and bolts.

The Abridgments marked thus (* *) in the following pages were prepared for another series or class, but as they also relate to subjects belonging to the present series, they have been reprinted in this volume.

B. WOODCROFT.

February, 1873.

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INTRODUCTION.

That the art of forging and the use of nails and spikes, for the same purposes to which as permanent fastenings they are applied at the present day, were known to the ancients long before the Christian era is without doubt true, their origin possibly dating back to that remote period of the world's history when, in the days of the Patriarchs, according to the traditions of Holy Writ, Tubal Cain discovered and taught artificers the mystery or process of working in brass and iron. Be this however as it may, it is certainly true that necessity gave birth to the invention, that its want was apparent so soon as man began to build for himself a local habitation, and that of all the results of human ingenuity, there is nothing more simple, more generally useful, or more efficient in its universal application, than a nail.

In the Book of Isaiah, c. xxii, v. 22, B.C. 712 years, the word " nail " is symbolically used as an emblem of security "and I " will fasten him as a nail in a sure place ;" and v. 25, " In that " day . . . . shall the nail which is fastened in the sure place " be removed," and direct evidence that nails were known and in use long anterior to the above early date appears in the Book of Judges, c. 4, v. 21, wherein 1300 years before the Christian era is recorded the death of Sisera, who whilst asleep was slain by Jael, Heber's wife, who "took a nail of the tent," and by means of a hammer "smote the nail into his temple" so that he died. At the building of the Temple by Solomon, 1012 years B.C., we read in the II. Book of Chronicles, c. 3, v. 9, that " the weight of the nails was fifty shekles of gold," and a thousand years later, nails or spikes were employed in the barbarous custom of nailing to the cross those who were condemned.

That the forging of nails and spikes out of roughly prepared rods, bars, or ingots, was, down to a comparatively recent date, a work of considerable labour, we have little reason to doubt, and that much waste of the metal took place by reason of the repeated heating of it during the preparing and forging processes, and also in consequence of the rude kind of implements and appliances employed. Nevertheless this primitive mode of nail making by hand *with hammer* and *forge*, seems to have been practised with-

out any material change for thousands of years, probably dating from the earliest period of the world's history down towards the end of the sixteenth century of the Christian era, about which period the first mechanical experiments were made with a view to lessen the waste and labour of the hand forging processes, by the introduction in the mode, by means of water power, of cutting or preparing the nail rods or bars. This invention is due to Sir Bevis Bulmer, to whom in the third year of the reign of James the First, A.D. 1606, Letters Patent were granted for "A new
" Apt or Compendious forme or Kinde of Engine or Instrument
" to be put in vse, driven, and wrought withall by Water or
" Waterworkes, aswell for the concerning a Quicker and more
" Apt and Speedy Ways and meanes then theretofore within the
" Tyme of Man's Memory had been knowne, exp̃imented, and
" vsed within our Realmes and Domynions, for, in, and about the
" Cutting and making of Iron into small Barrs for Roddꝭ to serve
" for the Making of Nayles, for the necessary vse and service of
" vs and our Subiects, and alsoe, for the better Saving and better
" remedying then theretofore had bene vsed in our said Realmes
" and Dominions of the Waste that cōmonly grewe and happened
" of the Iron which was vsually cutt into the Said Small Roddꝭ
" by reason of the often Heating vnapt Instruments and Devises
" then vsed and practized for the cutting thereof."

As the records of Letters Patent at the Great Seal Patent Office commence in the year 1617, the title of this patent does not appear therein, but it is referred to in a Patent granted December 11, 1618, to Clement Dawbeney.

That Sir Bevis Bulmer failed to perfect his happily conceived invention, is a fact exciting little surprise, when we come to consider the obstacles and impediments which the pioneers of mechanical science had to encounter in those days, the seed time only of the fruits which have followed; and with respect to so early a beginner as was this worthy knight, his failure may have been chiefly attributable to the absence of mechanical skill in those he employed, and the want of proper tools and appliances for making his engine sufficiently powerful and capable of performing with that degree of certainty and accuracy necessary to produce the perfection the process required; for it must be borne in mind that in those early days, the smith or millwright had none of the mechanical tools of modern times to assist him in his work, his lathe if any was constructed of wood, and with forge, hammer, and chisel, file and grindstone, the work had to be performed.

An idea of the economy, utility, and value of this invention, as understood at that date, together with somewhat of its history, may be gathered from the perusal of the following extract from the Letters Patent, although the language employed is to a certain extent merely formal, being in the usual phraseology of the time:—

"And whereas the interest of the said Sir Bevis Bulmer "of in and to our said Lr̃es Patentꝭ, and the lycence and "priuiledge thereby graunted was many yeares sithence trans- "ferred vnto our welbeloved subiect Clement Dawbeney, Genĩ, "who hath sithence, as wee are informed, with great charge "and travell brought the worke so as aforesaid begun by the "said Sir Bevis Bulmer to more ꝑfec̃on, but, by reason of the "shortnes of the terme which came to him hath reaped small "cõmodity to countervaile his labour and expences, neither is "the said feate or mistery as yet brought to such ꝑfection, but "that the same will be likely suddainely to decay and be over- "throwne againe vnles the same may be cherished and mayn- "tayned by some further priviledge. And whereas the said "Clement Dawbeney hath made humble sute and petic̃on unto "vs that he may not only make, erect, and put in vse within "our said realmes and dominions any such engine or instru- "ment so devised as aforesaid, or as he shall devise and make "of the same new apt or compendious sort, but also have our "Lr̃es of lycence and priuiledge that forasmuch as he is the per- "fector thereof within our realmes and dominions, and for that "the like thereof hath not bene by any other than the said Sir "Bevis Bulmer and himselfe heretofore vsed within the same, "and for that the same devise and invencion hath been at his "great charge, travaile, and expences brought to ꝑfection to "the generall good and profitt of the cõmonwealth as aforesaid, "and the tyme and terme of yeares by our former Lr̃es Patents "graunted is expired, none other may after the patterne "and example of the said engine or instrument make, ĩmitate, "counterfeit, or vse the same, or the like engine or instrument "within any part of our said realmes and dominions, or any "of them, during such terme of yeares as wee in our princely "wisdome shall thincke fitt, whereby the said feate and mistery "may be brought to full and absolute ꝑfecc̃on, and also he, the "said Clement Dawbeney may reape some fruite as well of "his owne labour and charges already taken and sustayned "in the rectifying and perfecting of this goode worke as of his

" further paynes and expences to be bestowed and expended in " the vndertaking, ꝑfecc̃on, maintenaunce, and putting in use " thereof."

The manufacture in this country of nails, screws, bolts, and rivets, forming collectively an important branch of the hardware trade, is chiefly concentrated in the midland districts between Birmingham, Wolverhampton, Dudley, Wallsall, and the surrounding towns and villages where, about the year 1830, subsequent to the first introduction of nail-making machinery, between fifty and sixty thousand of the population, including men, women, and children were employed in the forging of hand-made nails. The manufacture which dates back from an early period, is one of the oldest trades in the midland counties. It is stated in a work entitled the "Universal British Traveller," published towards the end of the last century, that the town of Dudley is large and populous, the people being chiefly employed in the making of nails; also that the town of Halesowen is well inhabited, and that the employment of the inhabitants consists in making nails. Before A.D. 1800 the nail masters of the district held meetings at Dudley to regulate the wages of the workpeople, and the holding of such meetings becoming an established custom, has been with few exceptions continued to the present time.

The work was and still is performed by the nail makers at their own homes, where they have what is termed a nail shop. These nail shops also frequently formed part of the establishment of small farmers, who with their families engaged in the employment of making nails, when they could not work on their farms. The nail iron, slit into fine rods (according to the plan or system proposed for the supplies of the nail makers by Sir Bevis Bulmer) in sizes suited to the description of the nails required, was and is in many cases, still delivered from the store of the nail master to the workpeople, who (as formerly) at the end of a week return it manufactured by hand labour into nails. In nearly every district a different class of nails is manufactured, so that a workmen and the several members of his family being constantly engaged in forging one particular class of nails become incredibly expert at the work, not only in the quantity produced but in the excellence of the workmanship.

For many years the poor hard worked and badly paid nail maker maintained the unequal struggle against the onward march of mechanical intellect, until at length as inventions of more perfect nail making machinery succeeded the machines made according to the inventions of former years, and the quality of machine-made nails improved, competition became more rife in the home and foreign markets, and the employers of labour were beaten by the employers of machinery; the wages of the work people being frequently reduced, constant strikes and disputes with the masters followed as a consequence, the Belgian made nails, though generally inferior in quality were, by reason of the low price at which they were sold, preferred in many markets, the falling off of the American and Canadian trades, and the amazing quantity produced of machine-made nails had eventually the effect of reducing the number of hand nail makers who at the present day amount to about one-third of their former aggregate. The nail trade formerly in the hands of many masters, is now confined in the midland districts to a few firms who, with capital and powerful machinery of the most approved construction, manufacture and sell their nails by the ton, instead of as formerly by the hundred weight or pound, and although there is always existing a keen competition with foreign nail producers, English made nails supplied to shipping merchants, find their way into almost all the important neutral markets of the world.

Screws are comparatively a recent invention, those called "wood "screws" being formerly made by a slow tedious process; the blanks were first forged and then shaped by hand; the nick was cut across the head by means of a hand saw, and the thread was worked out with the aid of a file; in fact, the time and labour required to perfect a single screw was so considerable as to preclude their general use. By degrees however, mechanical appliances were employed in the manufacture, the heads were turned on a kind of lathe, the nicks were cut by revolving cutters, and the threads fashioned by dies. This industry is also an important branch of the hardware trade, chiefly confined to Birmingham and the adjacent places. In the year 1760 the first patent was granted for an invention relating to the adaptation of mechanical appliances in the processes of screw making, and in "Shaw's, Staffordshire, A.D. 1798," it is stated that "screws "to drive into wood were made at Burton-on-Trent, before 1798, "by Messrs. Shorthouse, Wood, and Co., the blanks being "forged out of iron wire, for which they paid Messrs. Lloyd's "and Thornwell's forges about 500*l*. per annum. Thirty "pairs of hands were employed in screw making. They also "made screws at Tettenhall and Hartshorn, in Derbyshire, were

" they employed fifty-nine pairs of hands, and made 1,200 " gross per week, by means of thirty-six engines or lathes, " turned by one water-wheel, each cutting, with great velocity " eight or nine screws a minute, and was stopped eighteen " times in that short period to put in and take out the screw. " They were made of various sizes, from half an ounce to 30 lb. " per gross. Children could earn, by the employment, from " 1*s.* 6*d.* to 19*s.* per week. Before the present war, iron screws " could not be made fast enough for exportation; but they still " make 100*l.* per week, and have now (1796) a warehouse in " Burton-on-Trent, stored with 4,000 gross."

The best screw-making machinery of the present day feeds itself, is self-acting in all its parts, most rapid in its movements and perfect in its operation. Each screw produced is a counterpart of the rest, all are beautifully finished, and by reason of the moderate price at which they are sold (one firm alone producing about 100,000 gross of all sizes weekly), English made screws find a market in every quarter of the globe.

Various machines are in general use for cutting screws adapted to mechanical operations, and divisional screws for mathematical purposes are made by machines of exquisite construction, amongst which those invented and made by Sir Joseph Whitworth ought to be mentioned as marvels of standard accuracy.

The scientific reader whilst going through the abridgments as chronologically arranged in the following pages, can easily trace therein the gradual progress which scientific skill has made in developing the power of mechanism when practically applied in the production of nails and screws; some of the inventions, especially those relating to screws, have been conceived and worked out with great ingenuity and skill, and with regard to others, no doubt many anxious days and nights have been passed by their originators in waiting and watching for results that were never realised; also although the poor hand nail maker has been in a great measure deprived of his occupation, a fair demand for certain kinds of hand made nails still exists and more especially for horse-shoe nails, which require that portion of the ductility and strength of fibre to be retained by the metal, of which nails made by machines have generally been found deficient.

NAILS, RIVETS, BOLTS, SCREWS, NUTS, AND WASHERS.

NAILS, RIVETS, BOLTS, SCREWS, NUTS, AND WASHERS.

A.D. 1618, December 11.—N° 10.

DAWBENEY, Clement.—This is an invention of improvements on an engine or instrument wrought by water power, for which prior letters patent then expired were originally granted to Sir Bevis Bulmer, whose invention consisted in cutting iron into small bars for rods applicable to the making of nails, the object being to remedy and save "the waste that cōmonly grewe and " happened of the iron which was vsually cutt into the said small " roddꝭ by reason of the often heating, vnapt instruments, and " devises theñ vsed and practized for the cutting thereof."

The improvements, for which the above dated subsequent letters patent were granted, are not further described.

[No Specification enrolled. Letters patent printed, price 4*d.*]

A.D. 1678, February 11.—N° 207.

HARVEY, Thomas.—"An engine for the drawing of both " Spanish and Swedish iron into all sorts of rounds for bolts for " shipping and other uses in a much better and more expeditious " manner than the same have hitherto been performed by the " smiths' hammer."

[No Specification enrolled. Letters patent printed, 4*d.*]

A.D. 1760, May 14.—N° 751.

WYATT, Job, and WYATT, William.—This is an invention of apparatus for cutting wood screws. It consists :—

1st. In preparing and shaping the blank screw, which during the process is held by a pair of clams fixed at the end of a spindle, which is actuated by the power, means under the control of the workman, being provided for stopping and setting the apparatus in motion.

2nd. Relates to cutting the groove or nicking the head, which is effected by means of a set of steel cutters, in contact wherewith the screw blank, which is held by dies, is forced by means of a screw.

3rd. Consists in apparatus whereby by means of steel cutters the thread is formed. The blank screw being fixed in dies at the end of a revolving spindle, is brought between the cutters, which are caused to advance from opposite directions and by repeated operations form the thread.

[Printed, 4*d*. No Drawings.]

A.D. 1766, July 31.—N° 854. (* *)

PURNELL, John.—" New-invented machine for making ship " bolts, large round rods of iron and steel, and iron and steel " wire of various sizes, that is in many respects far more service- " able and preferrable than any method that has hitherto been " made use of for that purpose." This machine consists of a pair of cylindrical rollers working into each other, grooves being cut in one of them of the several sizes required for the rods, and corresponding projecting rings wrought on the other. The faces of both grooves and rings are hollowed in the form of a semi-circle, so that where they are in contact a perfect circle is formed. The shaft or axis of one of these rollers has a rotary motion given to it by a water-wheel, and this is communicated to the other roller by means of two cog-wheels, one of which is set on the axis of each of the rollers.

[Printed, 6*d*. Drawings. See Rolls Chapel Report, 6th Report, p. 159.]

A.D. 1769, November 27.—N° 938.

ASHTON, Joseph.—This invention relates to "a method of " casting and making of coffin nails and tacks out of or from pig " iron, commonly called cast metal, and of tinning the same." It is described by the inventor as follows:

" Melt pig iron . . . . in crucibles in an air furnace, and " run the metals when so melted into moulds filled with sand or " loam, wherein the impressions of coffin nails and tacks have " been first taken off from leaden or other soft metal patterns, " and then heal the same nails and tacks in a fire made of coke " from coal, by a gradual heat for the space of twelve hours or " thereabouts, whereby the same will become tough and malle- " able, and fit for use. And as to the tinning of such nails and

" tacks when made, my method is as follows:—Put such nails " and tacks into a pickle made by me of an acid spirit, commonly " called or known by the name of mineral acid, mixt with water, " which will soften the scurf left on the nails and tacks after " casting and healing, then scour such nails and tacks by turning " them about in a wooden barrel for a sufficient time, which fits " them for tinning, and then put such nails and tacks over the " fire in an iron vessel mixt with tin or pewter, and a sufficient " quantity of sal ammoniac, and shake such vessel about until " the tin or pewter is compleatly spread over such nails and " tacks, and then after burnishing or lackering, or both if " thought fit, of such nails and tacks, the same are compleatly " finished."

[Printed, 4*d*. No Drawings.]

A.D. 1771, June 25.—N° 992.

ASHTON, Joseph.—This invention relates to the manufacture of various kinds of cast-iron nails. The process is described by the inventor as follows:—" Melt pig iron, commonly called cast " metal, in crucibles, in an air furnace, or in a metallurgic " furnace, and run the metal when so melted, into moulds filled " with sand or loam, wherein the impressions of the above- " mentioned nails have been first taken off from leaden or other " soft metal patterns, and then neal the same nails in a fire made " of coke or coal by a gradual heat, whereby such nails will " become sufficiently tough and maleable, and be completely " finished."

[Printed, 4*d*. No Drawings.]

A.D. 1778, February 5.—N° 1179.

HARRISON, William, and ATHERTON, Peter.—This invention, relating to a process of cutting screws adapted for the purpose of making correct divisions on mathematical instruments, is described by the inventors as follows:—

" To make screws perfectly true, and likewise to employ a screw " so made for the dividing straight and curved lines, and thereby " render it easy to make a great number of those mathematical " instruments, which are the most essential to science and navi- " gation, perfect, and for want thereof have been imperfect, the " said screws are to be made is by truly transferring the motion " generated by two planes, inclined towards each other, sliding

" so as to approach or recede from each other by an equal motion " to a point, cutting a screw upon a cylinder, moving round its " own axis or to the cylinder, letting the point remain at rest; or " when such screw is so truly made, by making another screw " from it. The strait or curved lines are to be truly divided by " employing a screw so made to move a rack, or to be moved " thereby, to which the instrument to be divided being fixed, it " will be made to approach or recede from a given point, upon " which a cutter is placed, to a distance equal to one thread of " the screw, by one revolution thereof, and consequently to any " fraction of that distance by the same fraction of one revolution, " which fraction is ascertained by means of an index."

[Printed, 4*d*. No Drawings. See Rolls Chapel Reports, 6th Report, p. 164.]

A.D. 1779, December 10.—N° 1240. (* *)

KEIR, James.—" A compound metal capable of being forged " when red hot or when cold, more fit for the making of bolts, " nails, and sheathing for ships than any metals heretofore used " or applied for those purposes, and also for various other pur- " poses where other metals have been used or applied." To make the compound metal combine together 100 parts of copper, 75 parts of zinc or spelter, and 10 parts of iron. First melt the iron and copper together in the presence of charcoal, and pounded glass or other fluxes; then add the zinc by degrees.

[Printed, 4*d*. No Drawings. See Rolls Chapel Reports, 6th Report, p. 165.]

A.D. 1783, December 17.—N° 1408.

PLAYFAIR, William.—This is an invention of apparatus for cutting or dividing, or giving to metal strips, rods, or pieces lengthwise a round, curved, tapering, or other form, applicable to a variety of purposes. Also producing on metallic surfaces figures in relief, suitable for mouldings, cornices, and general purposes, where brass nails and other devices for ornamentation had previously been used.

The apparatus employed consists of a pair of rollers, which are suitably mounted in side frames. The form or design required to be produced is raised on the surface of one roller, and indentations exactly of corresponding form or design are sunk in the surface of the other, and by means of screws the distance between the two rollers is adjusted to the thickness of the metal sheet or piece about to be passed between, either in a heated or cold state, the rollers operating as revolving dies.

Instead of rollers segmental surfaces may be employed.

[Printed, 6*d.* Drawing. See Rolls Chapel Reports, 6th Report, p. 142.]

A.D. 1789, July 7.—N° 1691.

TODD, THOMAS.—This is an invention of machinery for making screws and nuts, and boxes for screws, the object being first to form rough threads on screws, and corresponding threads in nuts and boxes by means of dies, and then finish them by subsequent mechanical processes, and to this end various machines are devised and exhibited. In the first described, dies or swages are employed to form rough threads on screws, one part of the die being made a fixture on the block, whilst the other or corresponding part is fixed to the face of a large hammer, the two when meeting forming a "box for a screw." The rod from which the screws are formed in a heated state, receives when laid upon the bottom swage a succession of blows from the hammer swage, whereby the rough thread is formed upon the pin or rod. Other plans and details for carrying out this part of the process are described.

The screw-threads are finished by a revolving cutter, the screws being held by the head during the process, by nippers or pincers. Other apparatus is employed to finish and nick the heads, and when finished they are polished by friction against each other in a revolving barrel. The specification explains the whole process, and describes machines for making bed screws.

[Printed, 10*d.* Drawings. See Rolls Chapel Reports, 6th Report, p. 180.]

A.D. 1790, July 17.—N° 1762.

CLIFFORD, THOMAS.—This invention relates to the making of wrought-iron nails. The apparatus employed consists of two rollers properly mounted in a suitable frame, and by means of tooth wheels fixed respectively on the axis of each roller, are caused to revolve simultaneously at a corresponding speed. These rollers act as revolving dies, there being a line or lines of recesses sunk round the surface of each, forming rows or a row of cavities severally in the form of nails joined head and point together, half the depth of a nail being cut out of each roller. The nail rod in a heated state whilst passing between the rollers is squeezed into the cavities, and thus formed into a line of nails, in which in succession the head of one is joined to the point of the next, or the dies may be formed so that the two heads and the two points may alternately come together. By after processes the nails are separated and finished by suitable instruments.

Flat dies may be employed.

[Printed, 4*d*. No Drawings. See Repertory of Arts, vol. 7, p. 217.]

A.D. 1790, July 28.—N° 1768.

FINCH, William.—This invention of machinery, to be actuated by water, steam, or other power, for making nails and spikes, consists in the application for the purpose, of power to helve or tilt hammers, which are set in motion by arms or tappets; also in the manner of dividing the labour of the attendant work people, there being "three divisions of hands in the manufac-" turing of headed nails, namely, one man, woman, or child, to " carry the heated rod to the man, woman, or child stationed " before the hammer, which man, woman, or child, by mere " activity, will, with one hand, not only form the largest sized " nail, but a far greater number in the same given time; when " the third man, woman, or child will, with the same kind of " hammer, head and finish a number of the said shanks together, " leaving them truer made and better for use than the present " mode. . . . . . . Also, by heating many rods in one fire there " will be a saving of coal. Also, by the more speedy motion of " the machine hammers, several nails will be made at once heating " of the rod, whereas by the old method only one is made, con-" sequently there will be a great saving of yield. Also, the " motion being regular, independent of strength, a child will be " able to make the largest nail or spike."

[Printed, 4*d*. No Drawings. See Repertory of Arts, vol. 9, p. 390.]

A.D. 1790, December 4.—N° 1785.

CLIFFORD, Thomas.—This invention, relating to the manufacture of wrought-iron or other metal nails, consists—

1st. In drawing the metal bar or plate to a varying thickness, in section tapering or wedge-like, according to the length and thickness required for different sizes of nails.

2nd. "Cutting out" the nails by means of a punch from the prepared bars or plates. The form of the face of the punch corresponds to the longitudinal section of the nail; it fits to a steel die, through which, by a blow or pressure, the nail pieces are driven.

3rd. Forming the heads by a heading punch. Each nail piece is placed in a bed corresponding to the intended size of the nail, the shank end receiving the pressure of the punch, which has a hollow on the face answering to the desired size of the head.

4th. Cutting out nail pieces from plates of uniform thickness, and pointing them afterwards in the usual way with the hammer.

5th. Making triangular nails, or nails of other form, by the first-described process.

Instead of drawing out the plates or bars after the manner described in the first part, passing the plates or bars between rollers suitably indented to produce a varying thickness of the metal, corresponding to the gradual diminishing form from the shank to the point of the nail.

[Printed, 4*d*. No Drawings. See Repertory of Arts, vol. 7, p. 377.]

A.D. 1796, August 19.—N° 2133.

GUPPY, SAMUEL.—This is an invention of two separate apparatus or machines, one for cutting, and the other for heading nails, both machines acting on the rotating principle.

In the cutting machine is fitted a roller, which carries at its opposite sides, placed in the direction of its length, two fixed dies or cutters. A shifting plate, carrying another die, is fitted to slide against the front of the roller, and is so controlled in its movement that, as the roller revolves, the die answers to both cutters, which alternately take off a portion sufficient for a nail, from the end of a flat rod of nail iron, the two cutters in succession forming the head of each nail alternately from the opposite sides of the rod.

The heading apparatus consists of a wheel furnished with three tappets, which lift three hammers each revolution of the wheel, the nails, carried by a chain, being during the process severally held in succession by the action of the machine in a position to receive the successive blows of the hammers.

[Printed, 8*d*. Drawings.]

A.D. 1797, January 31.—N° 2161.

COATES, GEORGE.—This invention relates to machinery for making horse-shoes, nails, brads, and other articles of iron and other metal.

The metal pieces used for forming horse-shoes are first cut into suitable lengths; they are then (in a heated state) placed separately across the head of a mould or series of moulds, which severally in form represent the inside of a horse-shoe. By the action of the machine the moulds are advanced between two rollers, while two thin small rollers on vertical centres operate laterally upon the metal; these rollers are separately mounted on converging slides, and as the moulds advance, they close upon the sides and press the metal to the form of the mould, the heel of the shoe being turned up by a part of the apparatus. The shoe is then placed on another mould, which, when passed through the machine, produces the fullering or grooving, and also the holes for the nails.

The machine, by a variety of shearing and other suitable apparatus and appliances fully described, is rendered capable of producing cut brads, tacks, ruffs for use in boat building, thimbles for ropes, staples, and other similar articles.

[Printed, 8*d*. Drawing.]

A.D. 1800, February 28.—Nº 2379.

MAULLIN, Richard.—This invention, relating to the casting of metallic screws, consists of mechanical apparatus whereby the pattern or model screws, of which any reasonable number may be employed, are simultaneously withdrawn from the bed of sand in which the moulds are formed, each pattern screw during its withdrawal being caused to rotate at a relative speed corresponding to the pitch of the thread, so that the models are unscrewed out of the sand. The screw heads are formed by projections on the mould plate, and through the center of these projections the pattern screws are severally caused to project a distance corresponding to the desired length of the screw, the making of the groove across the head of each screw being an after operation.

[Printed, 6*d*. Drawings. See Repertory of Arts, vol. 13, p. 6.]

A.D. 1801, February 17.—Nº 2482.

BENNOCH, John.—This invention relates to "new and expe-"ditious methods or machines for making nails, bolts, rods, "watch springs, clock springs, and metal plates." The metal rods are first reduced to the required size for nails or other articles by means of two disc rollers mounted on horizontal axles geared together by tooth wheels; one edge of each roller is grooved so as to form, when the rollers are adjusted together, a groove or channel corresponding to the required size of the rods, which are next passed between a pair of shaping rollers that act upon the rods whilst passing between them as a pair of revolving dies or swages, and give to the rods respectively the form of a string of nails joined head and point together. This result is obtained by the configuration of the rollers, the peripheries of which have the shape of a series of eccentric curves, which as the rollers revolve at a uniform speed, come into coincidence and form a series of revolving dies. The rods thus prepared move forward and are next operated upon by two steel cutters; these cut up the prepared rods into pieces or blanks, each blank having the tapered form of a nail; from the cutters the blanks are severally taken by carriers which move them towards the heading clams, to which they are presented by holding pieces moving in dovetailed slides.

The heading clams are closed by tappets projecting from a roller, which also carries a head presser for forcing up the die that forms the head; after this operation the die retires, and the clams relax preparatory to receiving the next blank which is coming forward from the cutters; the operating parts of the machine are so timed to work conjointly, that the three blanks formed on the metal bar every revolution of the shaping rollers are severally cut off and finished during the same interval of time by the successive operations of the machine.

[Printed, 1*s*. Drawings. See Rolls Chapel Reports, 6th Report, p. 200.]

A.D. 1801, June 20.—Nº 2517.

SPENCER, John.—This invention relates to the manufacture of horse-shoe nails, which by suitable dies are stamped from plates having transverse ridges, raised during the rolling process at regular intervals on one surface, corresponding to longitudinal grooves sunk along the surface of one of the rollers of the rolling machine. Intermediately between the ridges, the plates thus produced are afterwards transversely cut into short lengths, each corresponding to the length of two nails, the ridge being left equidisdant from each side. The punches or dies employed in the punching press cut two nails at a time, an enlargement at the mid-length of the die, (which tapers towards each end to form the points of the nails,) falling directly across the ridge. The piece cut represents two nails joined head to head; these are afterwards separated by apparatus suitable for the purpose.

Instead of employing punches to produce two nails at a time, single punches producing one nail may be used, and rollers may be employed for "the purpose of making impressions on iron or "other metal."

[Printed, 6*d*. Drawing. See Repertory of Arts, vol. 15, p. 316; Rolls Chapel Reports, 6th Report, p. 200.]

A.D. 1803, November 8.—N° 2739.

HODGETTS, BOOTH.—This invention relates to rolling iron to form shanks of nails. The rolling machine described contains two pairs of rollers. The first pair operates upon the blooms or slabs, reducing the metal to bars of the suitable size. One roller of the second pair is plain on the surface, but the other is so grooved or reduced at intervals in the direction of its length, as to produce a sudden thickness of the bar, which is gradually reduced by the form of the groove, leaving the bar in longitudinal section thick and thin, similar to the teeth of a saw, each tooth or serration being of the desired length to form a nail. After this operation the bars are slit into proper breadths, by such slitters or cutters as are generally used for the purpose. After slitting, the shanks are separated and smoothed, and then headed in the usual manner.

[Printed, 6*d*. Drawing. See Repertory of Arts, vol. 6 (*second series*), p. 16.]

A.D. 1804, December 19.—N° 2800.

GUPPY, SAMUEL.—This invention relates to improved processes supplementary to prior letters patent, bearing date August 19, 1796, No. 2133, which were granted to this patentee for his invention of machinery adapted to the manufacture of nails.

According to his improved process, after small pieces of metal, each of the required size to form a nail are, by means of a fly press and suitable tools, cut from a slip of metal, they are, in order to harden them, subjected to a stamping process; the head is next formed by the pressure of a suitable punch, the shank being placed in a plate which fits into a steel die. After trimming up the head the nail is pointed, for which purpose it is laid in a die, which in form tapers to the required shape of the point. The die in the usual manner is fixed in the press, which is furnished with a suitable punch, the blows whereof finish the process.

[Printed, 6*d*. Drawing. See Engineers' and Mechanics' Enclyclopædia, vol. 2, p. 187.]

A.D. 1805, March 9.—N° 2829.

BELL, WILLIAM.—This invention relates to the preparation of blanks for the manufacture of knife and other cutting blades, and amongst other things to blanks for making nails. The process consists in operating upon the metal, which is first properly wrought to the required thickness, by means of rollers, one or both of which are grooved, so as to produce strips, which are afterwards separated. These strips vary in substance, being thick at one side, and thence gradually diminishing so as to form a thin edge on the other, answering to the back and edge of a knife blade, or transversely to the shank and point of a nail. Shears, or a fly press is afterwards employed to cut the blanks into separate pieces previous to the finishing operation.

[Printed, 6*d*. Drawing. See Repertory of Arts, vol. 7 (*second series*), p. 1. Rolls Chapel Reports, 7th Report, p. 188.]

A.D. 1808, May 28.—N° 3137.

WILLMORE, JOSEPH, and TONKS, JOHN.—This invention relates to the manufacture of nails by machinery.

The first process consists, by means of a common screw press furnished with two cutters, in cutting from the end of a nail rod two pieces, one cutter taking off length sufficient for the two nails, whilst the other divides the piece by an oblique cut, thereby forming a pointed end to each half.

The second operation anneals the pieces so cut when not sufficiently malleable.

The third relates to the formation of the head, which with dies suitably formed for making either rose or flat shaped heads, is effected by pressure, the piece forming the nail being held by a pair of clams, and by the

Fourth operation the point of the nail is finished; this is effected by pressing the nail into a tapering groove formed in the steel bed of the press.

[Printed, 6*d*. Drawing. See Repertory of Arts, vol. 13 (*second series*), p. 366; Rolls Chapel Reports, 7th Report, p. 106.]

A.D. 1810, July 26.—Nº 3365.

DYER, Joseph C.—(*A communication.*)—This invention, relating to four separate machines designed for the manufacture of cut nails and brads, consists of:—

1st. A machine for cutting and heading nails at one operation, the operating parts of which machine are actuated by the rise and fall of a "great lever" or lever arm, that, by means of a toggle-jointed connection, pushes forward a slider which carries a moving cutter and a gripping die to co-operate respectively with a fixed cutter and companion die, which are rigidly secured to the frame. The plate from the end of which the nails are transversely cut is fed by hand, and as fast as the nail pieces are severed from the plate, they are received in a "conducting box" and severally held by gripping dies, whilst the head on each is formed by a presser die. A nail is made and headed every rise of the lever, and the parts relax to allow of the escape of the finished nail as the lever descends. The cutters and dies are of tempered steel, and the position of the parts are made capable of adjustment, to suit the production of nails of different sizes.

2nd. Another machine for cutting and heading nails at one operation. This machine is also made to operate by the power of a great lever arm, at every rise and fall of which a nail is cut off by a moving and stationary cutter and held by gripping jaws, whilst upon it a head is formed by a pressing die. The plates in a heated state are fed by a holder and turned after each cut, so as to bring the two sides alternately uppermost, in order that, as the cutters deviate slightly from a right angle with the plate, each succeeding nail cut off may have a tapering form. The principle of action in this machine is similar to the first, of which it is a modification.

3rd. Machine for cutting nail-shives and brads. This machine has no heading apparatus. It operates by means of moving cutters fixed to a reciprocating slide co-operating with fixed cutters securely attached to the frame. Instead of turning the plate over after each successive cut, a tapering form for the cut-off pieces is ensured by a vibratory motion in a part of the machine, which alternately shifts the cutters to an acute angle on each side, by turns a slight deviation from a right angle to the longitudinal line of the plate holder.

4th. Machine for "heading shives." This machine is also operated by a lever, the gripping dies are closed by toggle points, and the shives fed to the holding dies by a rotating feeder. This machine is adapted for heading all kinds of nails.

[Printed, 4*s*. 8*d*. Drawings. See Rolls Chapel Reports, 8th Report, p. 82.]

A.D. 1811, April 11.—N° 3433.

FINCH, William.—This invention relates to a "method of " making nails of wrought iron," and consists, so far as can be ascertained from an obscure specification and an imperfect drawing, in rolling plate iron between rollers, certain parts of the surface of one roller having been so gradually reduced or removed, as to form alternate circumferential ridges and gradually inclining indentions, the other roller being plain on its surface. When the nail plate is passed between the rollers a contrary effect is produced, the full parts or ridges on the roller forming indentations or thin parts in the plate, gradually inclining to the full thickness left by the indentations in the roller, thereby forming what the inventor calls "waved iron" whence nails are produced by "the " use of tools commonly called the punch bed and bolster," the thin parts of the plate answering for the points of the nails, and the thick parts for the shanks.

[Printed, 6*d*. Drawing.]

A.D. 1812, March 4.—N° 3543.

DYER, Joseph C.—(*A communication.*)—This invention, relating to various machines designed for cutting and heading nails, is supplementary to a prior patent, dated July 26, 1810, No. 3365, and granted to the above patentee. The improvements in these machines refer to the mechanical and constructional arrangements and details, the use of the great lever whereby the operative parts of the original machines were actuated being now discontinued, and the necessary motions obtained from rotating crank shafts and eccentric cams, which are employed instead. The machines described consist :—

1st. Of a machine for cutting off and heading nails, operating upon narrow plates of heated metal. The moving cutter has vertical motion by means of a crank rod, from a crank above. The bottom cutter is fixed to the frame. The metal plate is fed by the attendant and turned over after every cut; a stop gauge regulates the feed and holds the nail-piece when cut off, whilst it is pushed down by the cutter into the groove of the fixed gripping die. The cutter then ascends and the nail piece is held by a lever during the advance and whilst the companion gripping die closes with the die which is fixed, and the nail piece is firmly held between them whilst the heading die approaches and forms the head, and when the parts have relaxed, if the nail is left sticking in the die, it is pushed out by a piece which, through a lever, obtains motion from a cam. A modification of this arrangement is described.

2nd. This is a duplex machine for cutting and heading nails, and contains two sets of cutting-off, gripping, and heading apparatus. The top cutters are adjustably attached respectively to the opposite arms of a horizontal lever, which oscillates on a central fulcrum, and obtains motion from a crank. The stationary companion cutters and gripping dies are rigidly attached to the machine frame or bed, and the moving gripping dies are linked to levers operated by inclines on the lever boss. The heading dies are projected by cam lever arms, and alternately have motion from the pressure of two rollers, respectively mounted at the ends of the oscillating lever. The two sets of apparatus operate alternately in accordance with the rise and fall of the ends of the lever, and the plates are turned over by the attendant between each successive cut.

3rd. This machine for cutting and heading nails, is operated by means of revolving cams, the parts sliding on a horizontal bed.

4th. This machine for cutting and heading nails, is also furnished with two sets of apparatus actuated by one driving shaft, which is disposed beneath the operating parts, and imparts motion to them by means of revolving tappets and cams. The two cutters are carried by a vibrating quadrant, and operate alternately, by turns cutting nail pieces from the metal plates of tapering form, to effect which instead of turning them over, a lateral movement is given to the plates. The cut off nail pieces fall into guide funnels, and thence, the thick end first, they fall between the gripper dies, which close and hold them whilst the heading punches rise and form the heads.

5th. Another machine for cutting off and heading nails. The operative parts of this machine are mounted on a horizontal bed, and the heading die is fixed projecting from the face of a helve hammer, which is lifted by a tappet on a crank shaft, the cutter being carried by a reciprocating slide, which obtains motion from the crank.

6th. Machine for cutting off, heading, and making two nails simultaneously.

7th. Duplex nail cutting and heading machine, furnished with two sets of operative apparatus, one set on each side, the respective cutters being attached one to each end of a reciprocating slide, which obtains motion from a cam or a rocking shaft, and the heading dies are actuated by means of side levers, that are set in motion alternately by the inclining surface of a reciprocating cam.

[Printed, 4s. 4d. Drawings. See Rolls Chapel Reports, 8th Report, p. 90.]

A.D. 1814, April 1.—N° 3798.

DYER, Joseph C.—(*A communication.*)—This invention, relating to machinery designed for cutting and heading nails, is supplementary to a prior invention which was communicated to the above patentee, and for which letters dated March 4, 1812, No. 3543, were granted to him. According to the improved machine comprised in the present invention, the cutters, grippers, and heading die, are actuated by a main shaft which carries a fly wheel and driving pulleys, and by means of cranks and eccentric places circumferentially formed on its surface, gives motion to beams, sliders, and levers, which in regular order move the operative parts. The narrow metal plates out of which the nails are made, are severally, when fed into the machine, pressed endwise against the face of a spring gauge beneath a cutter, which is adjustably fixed to the end of the main jaw or beam, and each time that the latter descends, this cutter operating in conjunction with a fixed cutter disposed directly beneath the end of the plate, cuts a tapering nail piece therefrom. The cut-off piece is held by the gauge whilst it is pushed down the face of the fixed cutter, and into the groove of a fixed gripping die, by the moving cutter, which then ascends, and the piece is immediately secured by a sliding piece, which is thrown forward and holds the nail by the pointed end whilst the companion to the fixed gripping die advances, and the nail is then held by the compression of the two dies, sufficient of its thickest end being left projecting from the ends of the dies to form a head, which is upset and shaped by a heading die, that is moved forward by a lever, actuated at the proper moment by an arm on the end of the crank shaft, the configuration of the head depending upon the shape of the recess in the die. After the parts have relaxed, the finished nail is pushed out of the groove of the die by a bearer, and the operation is repeated, the metal plates being turned over by the attendant after each successive cut, in order that the cutters, which incise at an angle deviating slightly from a right angle to the line of feed, may cut off pieces which taper to a point.

[Printed, 2*s*. Drawings. See Rolls Chapel Reports, 8th Report, p. 100.]

A.D. 1816, August 15.—N° 4060.

GILCHRIST, ANTHONY.—This invention, relating to a machine for making nails and screws, and for operating on metallic substances, consists of a circumposed series of revolving wheels acting collectively as dies, each one forming a section or side of the external surface of a nail or article under operation.

The drawing shows four, but a greater or lesser number may be used of such wheels, which are mounted on horizontal axes, and so disposed in relation to each other on the same plane that their peripheries, which are in transverse section right angular, meet at one common centre. Around the angular edge of each wheel, corresponding to the length and form of a nail, screw, or article to be produced, is a series of recesses, cut, when nails are to be produced, gradually inclining in depth, so that where the peripheries of the wheels are brought into contact, and by suitable gearing caused to revolve at a uniform speed, a continuous series of dies or nail-moulds is formed, each wheel moulding one side of the nails. The nail or other rod, heated to a red heat, is passed through a guide, and entering between the rollers is moulded into the form of nails or screws or other articles, which are separated and fall into a receptacle placed beneath the machine. To prevent heating, the revolving dies are made to dip into cold water.

[Printed 6*d*. Drawing.]

A.D. 1817, May 13.—N° 4117.

COLBERT, JOHN GERARD.—(*A communication.*)—This invention relates to apparatus adapted for making wood screws from metallic wire or rods, which are first, by means of a pair of shears, cut up into lengths suited to the desired length of the screws. Thence the pieces are severally taken and placed in a recess formed between the closed jaws of a pair of clamps; the entrance of this recess is countersunk, and forms a mould for the screw head, which is produced on the screw piece by the blows of a hammer, which upsets the end, and spreads the metal laterally. Mounted in another apparatus are two steel cutters on the ends respectively of a pair of curved levers that are closed by springs. These cutters shape the head of the screw, and the threads are formed by dies fixed in a clamping frame, the screw blank being advanced during the operation by the pressure of the end of a revolving mandril, which has a longitudinal movement imparted to it by means of a screw, corresponding in pitch with the desired pitch of the threads to be cut on the blanks. The nicking of the heads is the last operation, and this is performed simultaneously on a number of screw heads by means of a saw, the screws being ranged and secured in a suitable frame.

[Printed, 10*d.* Drawings. See Repertory of Arts, vol. 32 (*second series*), p. 73.]

A.D. 1818, May 7.—N° 4257.

TODD, THOMAS.—This invention relates to the "rolling of iron " and making wire, nails, brads, and screws."

The object obtainable by the rolling process is regular and equable form and size throughout the whole length of the bars or rods, and sharp corners and angles free from flaws or burrs. This result is obtained by the form of the rollers employed, which are grooved or rabbetted round one edge of their periphery, the groove on one roller lapping against the groove on the other, and forming, according to the shape of the grooves or rabbets, either a rectangular, round, or other opening for the passage of the wire or bar, small bowls being adjusted to run against the outsides of the rollers to resist the lateral strain.

Forming brads or nails by rolling the metal rods between rollers with indented surfaces, constituting or generating a series of moulds or dies when the rollers revolve in contact, half the mould or die being sunk in the circumferential surface of one roller, and the other half in the other, uniformity of speed so that the two halves of the mould come truly together, being secured by gearing on their respective axes; the metal rods are entered in front between the rollers in the usual way, and pass out at the back in the form of a string of nails, joined head and point together, to be afterwards separated.

Feeding two or a duplex brad cutting machine by one feeding apparatus, which obviates the necessity for turning over the narrow brad plate or fillet after each cut, and employing cutters of a particular form for producing brads with heads and points.

1. Cutting the threads on screw blanks by a circular revolving saw which roughs out the screw, the threads being afterwards cleared and finished by dies, which receive it from the saw, and are made to close upon it by a weight and spring. Whilst the saw operates, the screw, which is held in a kind of frame, is advanced by a master screw, the threads of which correspond with the pitch of the dies.

[Printed, 10*d*. Drawings. See Repertory of Arts, vol. 35 (*second series*), p. 8; Rolls Chapel Reports, 7th Report, p. 120.]

A.D. 1818, May 7.—N° 4258.

CHURCH, WILLIAM.—This is an invention of machinery for making nails, spikes, screws, and wire from iron, copper, or other suitable metal, and consists of:—

1st. "A peculiar adaptation and use of two or more pairs of " rollers disposed at right angles to each other. These rollers " are arranged to act upon the rod which is to be converted into " nails, spikes, wire, or screws, and communicate to it the required " form by corresponding indentations on their surfaces, each " pair pressing or shaping alternately the two opposite sides of " the rod, so as, in the case of wire, to reduce the rod throughout its length to the form of the wire required to be made, and " in that of nails, spikes, or screws, to form of the whole a continued string thereof, with their head and point ends respectively contiguous."

2nd. Separating the nails by nippers, and conveying them to a heading wheel.

3rd. Adapting a heading wheel for receiving the nails when separated, and conveying and presenting them by its rotative movement to the heading punch, firmly holding them during the operation.

4th. Giving motion to the heading punch by means of jointed bars.

5th. Cutting nails and brads by means of a machine, wherein a cylinder which carries two cutters is mounted; these cutters act upon the end of the narrow nail plate, taking off alternately a piece the size of a nail every revolution of the cylinder.

[Printed, 10*d*. Drawing. See Rolls Chapel Reports, 8th Report, p. 125.]

A.D. 1818, November 10.—N° 4303.

WOOLLEY, Edward.—This is an invention of machinery for making wood-screw forgings, which machinery it is the intention to actuate by any kind of motive power. It is briefly described by the inventor as follows:—" The screw forging is formed or " shaped from round or cylindrical rod iron, which is cut off, " either in a hot or cold state, into proper lengths by a pair of " shears, and then put into a mould, commonly called a bore, " which bore has a hole in it the size of the screw, and counter- " sunk at top, and held by a pair of clamps or vice underneath, " then struck by a stamp working by perpendicular slides, or by " a press, either perpendicular or horizontal, which forms the " shank into a taper or conical shape, and also forms the head of " the forging at one blow, which, by the operation aforesaid, is " made fit for the purpose of being formed into a screw in the " usual way, and which forgings, before the said invention, had " always been forged by hand and not by machinery; the clamps " or vice underneath the bore are closed to hold the shank of the " forging, by an horizontal screw, while the blow is struck, and " opened by the same means, and which horizontal screw is " moved by a lever or crank."

[Printed, 4*d*. No Drawings. See Repertory of Arts, vol. 36 (*second series*), p. 77; Rolls Chapel Reports, 8th Report, p. 133.]

A.D. 1821, May 1.—N° 4554.

LAW, Alexander.—" Improvements in the formation of bolts " and nails for ship and other fastenings."

[No Specification enrolled.]

A.D. 1821, July 17.—N° 4571.

LAW, Alexander.—This invention, relating to bolts and nails for ships and other purposes, " consists in giving the bolts and " nails . . . such a form or figure that when once driven home into " their place, they cannot work themselves out by jars or strains; " and this I effect by forming them with four, five, or a greater

" number of sides, and consequently as many intervening angles, " and making the said sides and angles to wind round the axis of " the bolt or nail in a screw form, so that the said bolts or nails, " when in the act of being driven into a hole of proper size, revolve on their axis as they are made to advance by the force " applied to them, and the pieces therewith bolted together are " held much more securely than they would be with common " bolts, as the bolts thus formed cannot be drawn from either the " one piece or the other therewith bolted together by any of the " common strains to which such fastenings are exposed without " absolutely tearing out a portion of the solid substance of the " wood. Of these improved bolts and nails, a proper idea may " be formed by conceiving them, in the process of manufacturing " them, to be formed in the first place into polygonal rods or " prisms of as many sides and intervening angles as may be required, any portion of which rod, if equally twisted, would " assume a screwed appearance, and would, in fact, present a kind " of screwed bolts, composed of as many threads as there were " angles originally given to the piece of rod before being thus " twisted, and such a piece of polygonal rod, when thus treated " may be considered as a bolt or nail of my said improved form."

[Printed, 4*d*. No Drawings. See Repertory of Arts, vol. 43 (*second series*), p. 207; London Journal (*Newton's*), vol. 2, p. 334.]

A.D. 1823, November 9.—N° 4877.

GLASCOTT, George Minshaw, and MICHELL, Tobias.—This invention relates to making nails for fastening the copper sheathing on ships and for other purposes, and consists in so forming the heads of such nails, that, when driven home, no cavity remains between the underside of the head and the sheathing, thereby preventing the formation there of corrosion or of saline deposit. This is effected by making the upperside or top of the head convex, and the underside perfectly flat or slightly hollow, instead of as heretofore having the convexity under the head and the flatness at the top.

[Printed, 4*d*. No Drawings. See London Journal (*Newton's*), vol. 8, p. 71.]

A.D. 1824, April 7.—N° 4932.

SPENCER, Joseph.—This invention relates to the construction of furnaces or forges, adapted for the preparation of iron or steel to be employed in the manufacture of nails and other articles. The furnace is built of brickwork, and circular in form; it is four feet in external diameter, three feet high, and has a central fireplace two feet in diameter, provided with a fine cast-iron grating, provision being made for inserting the tue iron and the bellows-pipe.

The fuel employed consists of about one part of wood charcoal, and three parts of prepared or purified coal; these proportions however are to be varied according to the nature or quality of the coal and the kind of metal to be wrought. The coal is purified as far as possible by calcination, the object being to remove the sulphur and other noxious matter. Six workmen may be employed round the furnace in nail making, the bellows being arranged for working by means of a double lever united by a bow passing round the chimney, so as to be within reach of all the workmen, who will, by severally acting at intervals, be able to keep up a continuous blast.

[Printed, 4*d.* No Drawings. See Repertory of Arts, vol. 1 (*third series*), p. 137; London Journal (*Newton's*), vol. 9, p. 15; Mechanics' Magazine, vol. 3, p. 353; Register of Arts and Sciences, vol. 2, p. 230.]

A.D. 1825, November 8.—N° 5286.

ECROYD, John, and WILKS, James.—This is an invention of a machine for cutting nails, sprigs, and sparables. The working parts of the machine are mounted in a cast-iron frame, properly secured to the floor and to a beam above. The machine contains a pair of cutters, one of which is fixed, and the other, with reciprocating action, is secured to a movable part of the machine; the edge of the working cutter is made with a curve in order that the working angle may be equalized throughout the cut. The ends of twelve flat bars of nail iron, as exhibited in the drawing, are operated upon at the same time, the width of the bar representing the length of the nail or brad; these bars, arranged firmly on a carriage side by side, present their ends to the cutters at a slight angle, in order that the nails or brads cut off may incline to a point, the rods between each cut being severally turned over by the action of the machine.

For making nails with heads, the movable cutter is grooved and otherwise modified.

[Printed, 1*s.* 2*d.* Drawings. See London Journal (*Newton's*), vol. 14, p. 250.]

A.D. 1827, March 17.—N° 5473.

WRIGHT, Lemuel Wellman. — This invention, relating to the manufacture of wood screws, consists of two machines, one designed for cutting off the pieces of wire and forming heads thereon, and the other for nicking the heads and cutting the screw threads.

The end of the wire is fed into the cutting off and heading machine between the chaps of a pair of pincers, which slide forward and insert it in the holding dies, where it is held fast by the pressure of a lever whilst it is cut off to the required length by a steel cutter mounted on a plate to which a sliding up-and-down movement is imparted by a lever operated by a cam, the same action of the lever causing a friction roller to close the dies by bearing upon the piece which carries the movable die, the inner extremity of the two dies when together forming a recess or mould round the end of the wire, which is upset by the first heading punch, and spreading laterally is compelled to take the form of the mould, the heading punch, by the interposition of a bar and friction roller receiving its movement from an eccentric cam. After the first heading punch has operated the blank by means of spring clips attached to a carrier bar is moved laterally into a position opposite the second heading punch, which perfects the form of the head, whilst the first heading punch is operating upon the succeeding blank.

The blanks are fed into the nicking and threading machine by means of a revolving wheel provided with a circumposed series of notches forming holes in which the blanks are severally placed. This wheel has an intermittent motion, each move forward being a divisional portion of a revolution, bringing the blanks in succession opposite a pair of fingers, by which they are by turns transferred to a pair of pincers which hold them whilst the nick is cut across their heads by a circular saw; thence by a second pair of fingers the blanks are transferred to a second pair of pincers that hold them rigidly in succession whilst the screw is cut, a chisel-formed instrument being projected by a small cam into the nick to prevent them turning during the operation. The threading dies are fitted in a die box mounted on the end of a reciprocating revolving mandril, the dies being circumvested by a steel ring, which yields when the dies begin the cut, but closes them to a proper bearing as the work progresses, the reciprocating movements of the mandril being caused by a toothed sector that oscillates on a fixed centre and engages with a pinion fixed upon the mandril, the back end of which is screw-threaded and works through a stationary nut in the frame standard, the screw on the end of the mandril and the pitch of the dies corresponding. After the operation the parts relax, and the finished screw falls into a receptacle below.

[Printed, 3*s*. Drawings. See London Journal (*Newton's*), vol. 5 (*second series*), p. 313.]

A.D. 1827, December 4.—N° 5578.

LEDSAM, DANIEL, and JONES, WILLIAM.—This invention relates to machinery for making sprigs, brads, and nails, which are transversely cut from the ends of flat iron or other suitable metal rods, the heads or thick ends being cut alternately from the opposite sides of the rods, the breath of the rods respectively determining the length of the brads or sprigs, straight cutters being used; the form of these cutters when nails are being produced, requiring modification in order to make the shoulder which forms the heads. Two pairs of cutters, one of each pair being fixed and the other movable, are mounted in a vibrating frame, and they operate on several rods at the same time, a lateral movement being imparted to the rods between each cut by means of a sliding bar, whereby the ends of the rods are presented to the cutters at a different angle every alternate cut, in order that the pieces cut off may taper to a point. The rods are fed into the machine at an oblique angle from above by means of a weight on the end of each, the weights respectively sliding on a parallel series of rods.

The operating parts of these machines are capable of adjustment in order that different sizes of brads may be cut by them, and modifications in the machinery to suit different operations are required. Several are described and illustrated.

[Printed, 1*s*. 4*d*. Drawings. See Repertory of Arts, vol. 8 (*third series*), p. 75; London Journal (*Newton's*), vol. 4 (*second series*), p. 84; Register of Arts and Sciences, vol. 2 (*new series*), p. 177; Engineers' and Mechanics' Encyclopædia, vol. 2, p. 184.]

A.D. 1827, December 18.—N° 5589.

TYNDALL, THOMAS.—(*A communication.*)—This invention relates, first, to combined machinery adapted for making by a rolling process and afterwards heading, nails, brads, and screw blanks, and secondly, to a screw cutting apparatus. In the nail making machine are combined to act conjointly, a pair of rollers, one of which has a series of paracentric curves, forming inclines at equal divisional distances across its periphery, the other roller having a plain surface, with a cutting off apparatus, a revolving die holder, and a heading die or punch. The metal rod out of which the nails are to be made, is in a heated state passed through a guide and enters between the rollers, which rotate a portion of a revolution at regular intervals, each forward move corresponding with the length of one of the curved inclines, the other operating parts of the machine being timed to act simultaneously in concert therewith. The curved inclines on the roller so alter the form of the metal rod, as to give it the appearance of a string or series of tapering pieces or nail blanks joined head and point together. The revolving die holder carries four socket dies, into which by turns as it passes from the rollers, the tapering end of the rod is thrust; the end piece or blank is then cut off at the junction formed by the rollers, leaving again a tapering end on the rod to enter the next die which is brought round opposite the rollers by the next move of the apparatus, whilst the piece just cut off is by the forward movement of the die holder, brought directly opposite the heading punch, the finished nails or articles being, during the subsequent movements of the die holder, pushed out of the dies. The screw cutting apparatus resembles in its general appearance a screw cutting or turning lathe, the peculiar features consisting in the manner of imparting to the slide rest, which carries the cutter, a reciprocating motion, and the means of giving any required obliquity to the thread of the screws.

[Printed, 1*s*. 2*d*. Drawings. See London Journal (*Newton's*), vol. 3 (*second series*), p. 184; Rolls Chapel Reports, 7th Report, p. 126.]

A.D. 1828, September 18.—Nº 5703.

WRIGHT, LEMUEL WELLMAN.—This invention relates to the manufacture of wood screws, and consists of two machines designed, one for cutting off the wire into the required length for screw blanks and forming heads thereon, and the other for cross nicking the heads of the blanks and cutting the screw threads.

Into the cutting off and heading machine which operates with two heading punches, the wire is fed intermittently through guides direct into the first heading die, by a pair of pincers mounted on a sliding plate and operated by toggle jointed levers, the end of the wire projecting into a recess or mould made in the back of the die. From the opposite direction the first heading punch, which is fixed in the end of a horizontal slide, approaches, and is forced into the recess of the die by toggle jointed pieces acted upon by an eccentric cam on the main shaft, the required length for a screw blank being cut off by a descending cutter. The partly formed blank is pushed out of the die by the end of the wire which is again brought forward by the feeding pincers, and the blank, by means of a pair of fingers carried by a horizontal sliding bar, is transferred to an intermediate station, and thence by another pair of fingers is moved opposite the second heading die, into which it is forced by the second heading punch, and the head is perfected thereby. Out of the second die the blank is forced by a rod, and by the aid of a third pair of fingers it is transferred to the side of the machine, in a position to be acted upon by a revolving cutter, which trims off the roughness left by the dies, and finishes the blank.

The blanks are fed by hand into the nicking and threading machine, and placed separately in holding notches made across projecting pieces and held by springs disposed at divisional distances round the periphery of a feeding wheel, which, by means of a pawl and ratchet wheel, is moved at intervals a portion of a revolution, bringing every second move, the blanks in succession into the jaws of a pair of gripping or holding dies, which are made to close upon them by toggle pieces, whilst a rotating cutter mounted on the end of a lever is passed across and cuts the nick in the head; the cutter then descends with the end of the lever, and the next intermediate movement of the wheel permits the approach between the holding notches of a bar or punch, which forces the blanks out of the then relaxing grippers in succession into the back end of a tubular mandril. At the front end of this mandril they are by turns received as they push each other through by a pair of holding jaws, the blank ends being projected into the threading dies beyond. To the mandril a backward and forward rotary motion is imparted by a rising and falling toothed rack, which engages with a tooth-wheel that has liberty to slide on the mandril, but revolves therewith, and cut or fixed on the back end of the mandril is the leader screw working through a fixed nut, whereby the necessary to-and-fro longitudinal movements of the mandril are obtained, the pitch of the leader screw and of the threading dies corresponding. After the threading operation the finished screw is removed from the dies by a sliding clip. Two modes of mounting the threading dies are described, and, when desirable, instead of combining the nicking and threading operations in one machine, the operating parts relating to the two processes may be separated, and made to constitute two separate machines.

[Printed, 3*s.* 2*d.* Drawings. See London Journal (*Newton's*), vol. 5 (*second series*), p. 314; Rolls Chapel Reports, 7th Report, p. 128.]

A.D. 1828, October 16.—N° 5717.

HANCORNE, Edward.—(*A communication.*)—This invention relates to a machine for making nails and spikes out of thin bar or rod iron, which is previously prepared in suitable sizes and convenient lengths, and used in a heated state. The several operations of the machine follow in rotation; a length suitable for a nail or spike is first cut from the rod in the machine by the action of two chisels, one moving and the other stationary, the piece cut off being held between "side steels" or jaws, is then headed by an adjustable hollow-ended punch, which slides in holes or carriers formed upon a movable frame that is actuated by a crank, the form of the hollow in the end of the punch determining the shape of the head of the nail. This operation finished, two paracentric-faced segmental swages come into action, and by squeezing the nail between them taper it to a point, another piece of the rod being cut off, whilst the preceding piece is headed, pointed, and passed on every revolution of the crank shaft of the machine, most of the operating parts of which are adjustable, excepting the swages, which must be changed to point nails of different lengths.

A modified plan for operating the heading punch is described.

[Printed, 8*d.* Drawings. See London Journal (*Newton's*), vol. 9 (*second series*), p. 135; Register of Arts and Sciences, vol. 3 (*new series*), pp. 285 and 344; Engineers' and Mechanics' Enclyclopædia, vol. 2, p. 187.]

A.D. 1831, July 13.—N° 6132.

PROSSER, Richard.—This invention relates to the manufacture of metal "nails or tacks for ornamenting boxes and articles "of furniture." These nails are composed of three separate parts, which are united without the use of solder or other fusible compound. One part constitutes the shank or stem of the nail, which is pointed at one end, and has a nob at the other; these shanks may be made in the way found most desirable. The next part constitutes the covering for the head, which is formed out of such thin metal as is suited to the style and purpose of the nail. It is first cut from the plate in the form of a disc, and then by pressure between suitable dies is brought to a cup form. The third part forms the back or under part of the head; this is cut out of a thin plate in the form of a disc, with a central hole for the shank, and is pressed into a dish form by dies. The three parts being placed together, by means of a suitable press with a matrix and punch, the under part of the head is forced into the cup-formed shell, and the edge of the latter is made to close and contract round the edge of the under part, whereby the two parts thus united are tightened upon the shank.

[Printed, 6*d*. Drawing. See London Journal (*Newton's*), vol. 8 (*second series*), p. 29; Register of Arts and Sciences, vol. 6 (*new series*), p. 195; Rolls Chapel Reports, 7th Report, p. 135.]

A.D. 1831, July 27.—N° 6145.

CHURCH, William.—An invention relating to "machinery "for making nails."

[No Specification enrolled.]

A.D. 1831, December 22.—N° 6200.

LEDSAM, Daniel, and JONES, William.—This invention relates to two machines, respectively adapted for making and pointing pins, and to a machine for making screw-blanks, rivets, and nails, the pointing of the latter to be subsequently done by hammering.

The wire is drawn through straightening studs, and protruded into the holding dies of the pin-making machine by a pair of pliers moved by jointed levers centering on a sliding plate, which obtains motion from an adjustable crank pin projecting from a radial sliding plate attached to the arms of the fly wheel, the position of the plate or throw of the pin determining the action of the feed, and consequently the length of the pin. The heading punch works through a tubular guide, and is forced up by a cam on the shaft which carries the fly wheel and driving pulleys. The wire passes through a hole in a fixed steel cutter plate, and is cut off by the lateral pressure of the dies.

The pin-pointing machine operates upon the points of the pins by means of a revolving file, the cylindrical surface of which is incurvated to correspond with the periphery of a grooved wheel, between which and the concave surface of a curved lever, the pins roll whilst passing the file, the contiguous surfaces of the wheel and lever being covered with wash leather; the pins are fed from a hopper.

Into the machine designed for making rivets, screw-blanks, etc., the wire or rod is drawn by a pair of grooved feeding rollers, actuated at a corresponding speed by tooth wheels which are caused to move intermittently by a ratchet and pawl, the wire passing through a tubular guide, and thence through a cutter into holding dies, the length depending upon the action of the ratchet, which is adjustable. By a lateral sliding movement of the dies the length of wire held between them is cut off and carried to a position exactly opposite a heading punch, which is forced up by a lever that obtains motion from a revolving cam. The punch operates upon that portion of the wire which protrudes through the dies, forcing the metal to spread laterally, the particular form of the head depending upon the shape of the cavity in the punch, or the recess formed round the projecting end of the wire when the dies are closed.

[Printed, 2*s*. 4*d*. Drawings. See Repertory of Arts, vol. 14 (*third series*), p. 71; London Journal (*Newton's*), vol. 11 (*conjoined series*), p. 164; Register of Arts and Sciences, vol. 7 (*new series*), p. 198.]

A.D. 1832, February 25.—N° 6232.

CHURCH, WILLIAM.—This invention relates to the manufacture of nails, and consists in preparing nail iron from plates or bars by compression between two pressing rollers in a machine, the prepared plate being afterwards cut or slit into narrow rods by common slitting rollers. One of the pressing rollers carries a series of projecting rings that fit into corresponding circumferential grooves cut in the surface of the other roller, which at regular segmental intervals, corresponding to the length of a nail, has its surface also so reduced longitudinally as to produce a varying thickness of the plate or bar, so that when slit, the rods have the appearance of a string of nails joined head and point together.

The specification gives a detailed description of three separate machines suitable for converting such slit rods, or rods otherwise prepared, into nails.

Describes the manner of feeding the rod into the first machine, the mode of cutting off a piece to point the shank, which is carried by a pair of pliers to a pair of moulding dies, that finish and hold the shank whilst the head is formed by the heading die. The wedge-shaped piece which is cut off to form the point of the nail answers for a shoe-bill.

The second machine, which operates on rods prepared in the same way, or by a modification which partially forms the nail head, performs the moulding and finishing of the shank by a reciprocating and rotatory motion of the moulding dies, instead of by direct pressure as in the first machine, and the carrying pliers and heading dies are varied in their action.

The third machine, for making nails from prepared and other rods, moulds the nails by the rotary motion of a series of dies placed radially in rotating plates or wheels, and the apparatus for heading and cutting off differs in mechanical details. The two last machines produce only chisel-pointed nails.

The last part of the invention relates to arrangements of machines for making the different kinds of cut nails, and for working with good effect the dies, punches, and tools described by Richard Prosser in the specification of his patent, dated July 13th, 1831, No. 6132.

[Printed, 4*s*. 8*d*. Drawings. See London Journal (*Newton's*), vol. 2 (*conjoined series*), p. 321; Rolls Chapel Reports, 7th Report, p. 138.]

A.D. 1832, March 1.—N° 6234.

JOYCE, John.—(*A communication.*)—An invention of "machinery for making nails of iron, copper, and other metals."

[No Specification enrolled.]

A.D. 1832, September 29.—N° 6315.

JOYCE, John.—(*A communication.*)—An invention of "machinery for making nails."

[No Specification enrolled.]

A.D. 1833, March 28.—N° 6401.

JOYCE, John.—(*A communication.*)—An invention of "machinery for making nails."

[No Specification enrolled.]

A.D. 1833, October 19.—N° 6493.

JOYCE, John.—(*A communication.*)—An invention of "machinery for making nails."

[No Specification enrolled.]

A.D. 1834, February 19.—N° 6558.

BERRY, Miles.—(*A communication.*)—This invention relates to several machines designed for making bolts, rivets, nails, and other articles, and partly applicable to other purposes. It consists of:—

1st. A machine for making bolts, etc. The required length of wire or rod is projected by a feeding apparatus at regular intervals, " into a pair of holding chaps and heading dies, which close upon " the end of the wire or rod, and cut off the required length to " form the bolt, rivet, or screw blank, and afterwards bring it " opposite the end of a heading punch, which is moved forward " by toggle joints and cams, and compresses the end of the wire " into the recess in the dies, and thereby forming the head of the " bolt, rivet or screw blank; and after effecting this object the " heading punch is drawn back by the action of the toggle joints " and cams; the holding chaps then move back to their former " position, and open to allow of the now headed bolt or rivet being " removed, and a fresh part of the rod or wire introduced between " them by the feeding apparatus."

2nd. Machine designed for making bolts, rivets, etc. of a larger size. In this machine the main shaft is placed under the holding tongs and heading dies, and it is furnished with a pair of double grooved cams for operating the legs and thereby giving the necessary movements to the tongs and dies, instead of obtaining such movements by means of levers and cams as in the first machine, the toggle-jointed levers which work the heading punch being actuated by a long lever, instead of by a piece suspended from the joints.

3rd. A machine somewhat resembling the first in its operative parts. "The levers which give the movements to the " toggle joints and holding chaps and heading dies have yolks " or straps on the ends which embrace their several cams or " tappets, and the holding tongs and heading dies, instead of " rising upwards to carry the portion of wire or rod opposite the

" end of the heading punch, move sideways after cutting it off
" the length. And the feeding apparatus shewn in this machine
" is also different from that first described, but the same or any
" other apparatus which will bring the required portion of the
" wire or rod into the dies may be adapted to this or the other
" machines."

4th. Apparatus for forming small rivets or pins, operating by means of a lever which works the heading punch, and imparts a horizontal movement to the die, whereby the end of the rod, which is fed into the back of the die, is cut off and supported against the pressure of the heading punch by the surface of the bed on which the die slides.

5th. Machine for so shaping metal wire or rods by means of indented rollers, as to give to the wire or rod the appearance of a string or series of nails joined head and point together. It "consists of two indented swedging rollers which, as they revolve,
" give to the metal the required form for two sides of the spike
" or nail as the rod passes between them. In connection with
" the swedging rollers there are two large discs or wheels, the
" peripheries of which work against the sides of the small rollers,
" and keep the metal between them, and at the same time giving
" it the required shape for the other sides of the nail or spike."

Some of the machines may be adapted to the making of tenter hooks, and presses for punching boiler plates, cutting out collars, washers, and button blanks may be made on the same principle of construction.

[Printed, 2*s*. 8*d*. Drawings. See London Journal (*Newton's*), vol. 9 (*conjoined series*), p. 20; Rolls Chapel Reports, 7th Report, p. 149.]

A.D. 1834, February 27.—N° 6566.

WHITWORTH, Joseph.—This invention relates to hand stocks and dies for screw cutting, and to a screw cutting machine. In the die box of the hand stock are formed three radial grooves to receive the dies, which are simultaneously moved towards the centre by three eccentric inclines or curves, formed inside a ring or annular screw rack which circumvests the dies, and with which the threads of a screw tangently fixed engage.

The screw cutting machine consists of a horizontal bed mounted upon upright frames; a die box holder is mounted on a bracket capable of sliding on the bed, and is fixed thereto when the dies are in operation; a double standard or headstock with bearings to receive a mandril capable of sliding longitudinally, is made to rotate by one of two sets of differential speed pulleys, driven respectively, one set by a strap crossed, and the other straight. Upon one end of the mandril is a universal chuck, which holds one end of the rod upon which it is intended to cut the screw. The fore end of the leading screw fits into a socket in the back end of the mandril, which rotates independently, but is moved longitudinally by the rotating nut or screw box of the leading screw, at a speed in accordance with the desired angle or pitch of the threads to be cut on the rod. Various devices are availed of for imparting the necessary simultaneous radial movement to the cutting dies, including eccentric grooves, inclined planes and wedges, levers, and screws.

[Printed, 1*s.* 4*d.* Drawings. See London Journal (*Newton's*), vol. 5 (*conjoined series*), p. 266; Mechanics' Magazine, vol. 28, pp. 315 and 347; Rolls Chapel Reports, 7th Report, p. 149.]

A.D. 1834, February 27.—N° 6568.

FULLER, Thomas John.—This invention relates to machinery for forging wrought-iron nails with square points, and other nails with flat points. These machines operate by means of hammers having combined vertical and horizontal action, the object being to render the working and the effect alike as nearly as possible, to nails produced by hand labour. The machinery is actuated by power, and is fully described and illustrated in detail. The nails are made from rod iron, so cut up into pieces corresponding to the length of a nail by alternate, transverse, and oblique cuts, that each piece is left square at one end and partially pointed at the other. The pieces of metal thus cut off are first heated in a furnace, and thence in succession taken and laid in the feeding trough or groove of the machine, whence a carrier in rotation moves them forward to the hammers. The horizontal hammers strike simultaneously at opposite sides, alternating rapidly with the blows of another hammer which has vertical action, the successive blows varying in force, and three from each, finishing this part of the operation. The nail thus pointed is pushed forward by the succeeding nail, and enters between steel dies let into carrying rollers, which straighten and move it forward to the heading section of the machine, which consists of suitably-formed dies operating in conjunction with the other movements of the mechanism.

The manner in which the machinery operates, and its constructive details, are carefully elaborated.

[Printed, 4*s*. 2*d*. Drawings. See London Journal (*Newton's*), vol. 6 (*conjoined series*), p. 257.]

A.D. 1834, March 6.—N° 6571.

FULLER, THOMAS JOHN.—This invention relates to the manufacture of nails, spikes, and bolts, the sides of which instead of being flat, as is usual in the form of such articles, are longitudinally fluted, and it is proposed to make such nails, spikes, and bolts, by means of suitably formed dies, operating in the nail making machinery described in the specification of a former invention, the letters patent for which bear date the 27th day of February in the above-named year.

The iron rods for making large nails and spikes, may be fluted by a previous operation, and nails may be cast of any size with fluted sides.

The heading of wrought-iron nails is a subsequent operation to be performed by hand.

[Printed, 6*d*. Drawing. See London Journal (*Newton's*), vol. 19 (*conjoined series*), p. 34.]

A.D. 1834, March 18.—N° 6575.

CORDES, JAMES JAMIESON.—(*A communication.*)—An invention relating to "machinery for making nails."

[No Specification enrolled.]

A.D. 1834, March 18.—N° 6576.

CORDES, JAMES JAMIESON.—(*A communication.*)—An invention relating to "machinery for making rivets, and screw blanks "or bolts."

[No Specification enrolled.]

A.D. 1834, March 18.—N° 6577.

SLOCUM, SAMUEL.—An invention relating to "machinery for "making nails."

[No Specification enrolled.]

A.D. 1834, April 24.—N° 6599.

BETHELL, JOHN.—This invention relating to machinery adapted to the manufacture of screws, bolts, rivets, and pins, consists :—

1st. Of a machine for cutting off and heading screw-blanks, bolts, etc. The wire or rod is advanced at intervals into the machine by feeding tongs, and passes the required length through a hole in a cutter, which is caused to descend by the action of a cam on a lever and sever the length from the rod. The piece thus cut off is carried by a pair of reciprocating spring clips into a position opposite a heading die, the dies being actuated laterally by a double cam, which acts upon a lever attached to the sliding bar of the clips. By the advance of the heading punch the piece is forced into the die, the clips returning to receive the next piece taken off by the cutter. The heading punch is attached to a slide, which is forced up by the short end of a lever that has its fulcrum on a bolt fixed to the upper frame of the machine, and its long arm operated by a cam on the main shaft. The pressure of the punch causes the end of the metal piece to spread laterally and take the form of the recess or mould of the die. After the head is formed the blank is forced out of the die by suitable appliances connected to the retreating slide which carries the heading punch. All the parts are susceptible of adjustment to suit articles of different sizes.

2nd. Relates to the construction of heading dies adapted to machines. These dies instead of being in two parts, consist of one solid block double the length of the intended blank or bolt, &c., having a recess or enlargement at each end of a hole made through it, so that by its reversal in the machine, the block is made to answer the purpose of two distinct dies. The necessary resistance to the heading punch is afforded by a forcing punch or bolt, which entering the back of the die a regulated distance, is held against the end of the blank whilst the heading punch operates, and afterwards as the heading punch retires, is projected forward and forces the finished blank out of the die.

3rd. Relates to a feeding and discharging apparatus, adapted to the screw cutting machines described in the specification of a patent granted to R. W. Wright, September 18, 1828, No. 5703, into which machines, instead of feeding the screw blanks by means of an intermittently revolving wheel through a tube to the holding chaps, they are placed by a boy in a pair of fingers which carry them through the threading dies into the holding chaps. After the blank is threaded, it is removed from the holding chaps by another pair of fingers, which receive motion from a cam.

[Printed, 1*s*. 8*d*. Drawings. See London Journal (*Newton's*), vol. 5 (*conjoined series*), p. 241. Rolls Chapel Reports, 7th Report, p. 151.]

A.D. 1834, October 8.—N° 6686.

CORDES, James Jamieson.—(*A communication.*)—This is an invention relating to machinery adapted to the manufacture of nails from the rod. The operating parts of the machine, which is actuated by motive power, consist of a pair of segmentally divided compressing rollers, the periphery of each segmental division being eccentrically curved, in order that as the heated nail rod passes between them, a series or string of tapering pieces may be produced, the fullest or longest radius of each division of the two rollers gradually coming so closely together whilst forming the pointed end of pieces or nails as nearly to separate them severally from the rod. In conjunction with these two rollers, which act only on the two opposite sides of the rod, and timed in their motion so as to operate simultaneously with the rollers, and prevent the lateral expansion of the rod, are two guiding slides which, by means of sliding levers closed by the action of toggle joints, are brought to the other two opposite sides of the nail shanks as they are successively formed, whilst a pair of stretching holders, clasping the end of each shank in succession is moved forward by the action of the machine, thereby compensating for the elongation of the metal caused by its compression, and so prevents its bending. This operation takes place as the compressing rollers revolve between each segmental division, each shank as it is formed being seized by a pair of heading holders which move forward to the heading frame that carries the heading punch which is brought in contact with the end of the shank from an opposite direction, and "strikes up the head." The finished nails in succession are then separated by shears and deposited in a receptacle placed below the machine.

Printed, 10*d*. Drawing. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 446.]

A.D. 1834, October 8.—N° 6687.

CORDES, James Jamieson.—(*A communication.*)—This is an invention which relates to a machine for rolling and heading

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rivets, screw blanks, and bolts, which it makes from nail iron prepared in the rod.

Mounted on shafts, which by means of tooth wheels revolve at a uniform speed, is a pair of rollers. These rollers are set nearly in contact with each other, each roller being circumferentially fluted to correspond with the other and with the required size of the bolt or nail so that they form a pair of revolving dies. The metal rod in a heated state is introduced through a tube and brought into contact with the rollers, and entering between them in the circular space formed by the flutes, is thereby reduced to the required size; thence passing through a jointed continuation of the tube, the end of the rod is received by a pair of heading holders, and held whilst the heading punch strikes up the head, and a chisel on the shear lever cuts off, close to the heading holder, a piece corresponding to the required length for a bolt or rivet. The shape of the head is regulated by the form of the hollow in the heading holders, and the length of the bolt, nail, or rivet, by the thickness of the holders from face to back.

[Printed, 10*d*. Drawing. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 450.]

A.D. 1835, February 16.—N° 6768.

SLOCUM, Samuel.—This invention relates to the manufacture of nails from the rod by a process of rolling, and is supplementary to prior letters patent which were granted to J. J. Cordes, and bear date October 8, 1834, No. 6686. The metal rod, in a heated state, enters the machine through a guide tube and passes in succession between two pairs of reducing rollers, each pair acting on opposite sides. The surface of each of these rollers respectively is so grooved and fashioned in eccentric segmental divisions as to reduce the rod at regular intervals, and give it the form of a string of imperfectly shaped nails joined together head and point; thence passing through a tube, the rod enters between a pair of compressing rollers, at the same moment that a pair of shears cuts off the imperfectly formed nails in rotation as they leave the tube. These compressing rollers are also segmentally divided, and they perfect the form of the nail shanks previous to the next or heading process, which is performed in the machine by means of a heading punch.

The aim of the present invention is by so combining the action of the reducing and compressing rollers as to simplify the mechanism by omitting the use of stretching holders, and the slides and apparatus described in relation to the first invention as necessary to prevent the bending of the nail rod consequent on its elongation.

[Printed, 10*d.* Drawing.]

A.D. 1835, February 25.—N° 6775.

PROSSER, Richard.—This invention relates to the manufacture of nails from rod iron by a forging machine, and also by cutting them from bands or sheets cut into parallel strips, and to casting bands or sheets whence nails are to be cut, after the cast metal has been properly annealed and made malleable.

The rod which is to be made into nails, is heated by passing through a furnace situated between the machine and the operator, its movements being regulated by the latter or by a feeding motion. The tapering of the shank and pointing, is effected by the alternate pressure of two pairs of hammers or plungers, the hammers of each pair acting simultaneously at opposite sides of the rod. When the point is finished the action of the hammers ceases, whilst the point is pressed into a carrier and drawn in by pliers, and then by the operation of two cutters, the shank is divided from the end of the rod. The piece cut off is then moved by the carrier to the heading tools, the point of the nail during this part of the process being held by a suitably shaped socket or hollow die. The heading is effected by a forward movement of the latter in conjunction with a heading pin and rotary die, a nail or spike being thus formed and deposited in a receptacle every revolution of the machine, which is fully described in detail.

Cut nails are made from bands or sheets so transversely indented in the rolling process, that when cut into longitudinal strips, each strip forms a string of nails, in succession joined heads and points, to be separated by an after process. Wrought iron nails are also made by transverse cuts from narrow bands.

Describes the manufacture of malleable cast-iron nails, and also a heading apparatus, which operates with revolving dies.

[Printed, 1*s.* 6*d.* Drawings. See Rolls Chapel Reports, 7th Report, p. 160.]

A.D. 1835, December 16.—N° 6956.

GRIFFITHS, Robert.—This invention relates to machinery for making rivets, screw-blanks, and bolts, from round or otherwise formed rods of iron or other metal. Two machines are described, one adapted for light, and the other for heavy work. The dies or sockets are radially set in holes formed at regular distances through the periphery of a strong wrought-iron carrying ring, which is concentrically fixed to the face of a revolving disc. This disc is mounted on a horizontal shaft, which also carries a ratchet wheel, whereby an intermittent forward motion is imparted to the disc by means of a pawl, bringing the dies in rotation into coincident position with the operating parts of the machine. The internal periphery of the carrying ring revolves in contact with an anvil fixed above the axis, and a heading punch or die is mounted above the ring, and beneath the axis there is a trough which receives a current of water, into which the socket dies dip and are in rotation cooled as the carrying ring revolves.

The metal rod with a considerable portion of its length heated, is taken by the operator from a furnace, and pushed in face of a pair of shears through the socket or die then opposite into contact with the anvil; the piece is then immediately cut off, and by the intermittent movement of the carrying ring, in turn is brought under the heading punch, fresh metal being fed into each of the socket dies as they successively come up. Moving on after the head is formed and when clear of the anvil, the rivets or bolts are in succession by means of a clearing pin, pushed out of the socket dies before the latter dip into the water. For light work, the heading punches are worked by pressure, and for heavy work by a tilt hammer.

[Printed, 3*s*. 6*d*. Drawings.]

A.D. 1836, July 7.—N° 7143.

STOCKER, William Southwood.—This invention relates to machinery applicable to the making of nails, and to other purposes. These nails are made from nail rods by means of two pairs of hammers. The hammers of each pair act convergently, and the two pairs alternately strike in rapid succession at opposite sides of the end of the rod, which being first heated in the manner required for making hammered nails by hand, is presented between the two pairs of hammers at the point which intersects their line of action, the hammer faces severally inclining to an angle therewith, in order to produce the point and tapering form of the nail shank. The pointed shank thus formed is received and held by a pair of jaws, whilst it is taken off the rod by a pair of cutters, which having operated retire, and give place to a heading punch, that moves forward in a line with the longitudinal axis of the nail against the shank end, and forms the head before it is freed from the gripping jaws, and whilst the iron retains sufficient heat. The nail being finished, the jaws by opening, set it free and then close again upon the end of the rod, which in the interval has been pointed by the hammers.

The convergent alternating action of the two pairs of hammers is effected by means of tappets, and their divergence by the reaction of springs.

The operating parts of the machinery are capable of adjustment to suit the production of nails of different sizes, and the mechanical details require modifying when the machinery is adapted to the making of screw-blanks, bolts and rivets.

[Printed, 4*s.* 4*d.* Drawings. See London Journal (*Newton's*), vol. 9 (*conjoined series*), p. 344. Rolls Chapel Reports, 7th Report, p. 177.]

A.D. 1836, October 6.—N° 7203.

BERRY, MILES.—(*A communication*).—This invention, relating to the manufacture of wood screws, refers more particularly to a machine adapted for cutting the screw threads on blanks previously prepared. The operating parts of the machine are mounted on a horizontal bed, raised to a convenient height. They consist of a horizontal mandril, to the fore end of which is fitted a pair of jaws, whereto the threading or cutting dies are respectively fixed. These revolve with the mandril, and are made to open and close upon the blanks by means of a sway lever or other suitable contrivance, the mandril being moved endwise by a master or leader screw which is made to engage with a segmental nut, and which determines the pitch of the thread, the pitch of the dies corresponding. The blanks are held by the head with their points projecting from the periphery of an intermittently revolving blank holder or narrow drum wheel, and as this wheel revolves, the blanks in succession are brought into the exact position to be gripped by the dies, the onward motion of the wheel ceasing whilst the thread on each blank is cut. This being done the dies open, the leader screw is thrown out of gear with its nut, the mandril retires, and the wheel moves on a divisional portion of a revolution, bringing the next blank between the dies which again close, and the operation is repeated.

A modification of the parts which open and close the holding dies is described.

[Printed, 10*d*. Drawings. See Rolls Chapel Reports, 7th Report, p. 180.]

A.D. 1836, November 29.—N° 7237.

STOCKER, Alexander, and DOWNING, Henry.—This invention, relating to the manufacture of rivets, screw-blanks, and pins and other articles, consists;

1st. In the mode of constructing the dies which are employed in the process. These dies are to be made of cast-iron. A mould representing the die is first prepared from a model of its intended size, and in the mould is to be placed in proper position, an accurately prepared metal bolt, rivet, or blank, corresponding to the full form and size of the article intended to be made by the die; the metal when poured into the mould closes round the metal bolt, which, when the metal is nearly cold, is knocked out, leaving a cavity in the cast-iron die of exactly corresponding form, around which, in order to impart additional strength, is shrunk a wrought-iron hoop. In preparing iron for large screw-blanks, rivets, and pins, it is desirable that bars be rolled of unequal thickness.

2nd. Making burr or nut iron by a rolling process. The rollers employed have circumferential grooves corresponding to the width of the nut iron, and fixed into the roller across the grooves is a series of cutters, which partially divide the bars into square pieces, whilst projecting punches fixed intermediately between the cutters, partially punch the central holes.

[Printed, 10*d*. Drawing. See Repertory of Arts, vol. 8 (*new series*), p. 76.]

A.D. 1837, January 11.—N° 7271.

GRIFFITHS, Robert, and EVERS, Samuel.—This invention relates to machinery for preparing bars of iron, in such manner that they may be divided into burrs or nuts, each having six sides. This effect is produced on the bars by means of a pair of discs or rollers, which are suitably mounted in a frame. The periphery of each roller has a regular series of angular projections of equal size and number, so that when the rollers, by means of tooth gearing on the axis of each, revolve in conjunction, the apex of each projection on one roller points or comes exactly opposite the apex of a corresponding projection on the other. The width of these rollers corresponds with the thickness of the metal bar, which in a heated state is passed edgewise between them, all lateral expansion being prevented by two gauge plates, respectively fixed at the sides. By these means on both edges of the bar, are simultaneously formed a series of corresponding alternate angular indentions and projections, having the appearance of a string of sexangular nuts, which are afterwards to be severally separated by transverse cuts.

[Printed, 1*s*. Drawings. See Repertory of Arts, vol. 9 (*new series*), p. 321; London Journal (*Newton's*), vol. 12 (*conjoined series*), p. 149.]

A.D. 1837, January 28.—N° 7291.

BERRY, MILES.—(*A communication.*)—This is an invention of three separate machines, each designed to perform one of the processes required in the manufacture of wood screws; consisting of—

1st. The cutting off and heading machine, for producing the screw blanks. The wire out of which the blanks are made is coiled on a reel and drawn thence through straightening rollers by feed rollers and holdfast tongs, and passing through a cutter blade, enters and protrudes a short distance through a pair of gripping or heading dies, and is cut off by a movement of the back die, which acts as a cutter in conjunction with the edge of the hole in the cutt blade. Around the projecting end of the cut off piece of wire there is a recess partly formed in each die, and this recess constitutes a head mould when the heading punch, which is forced up by a cam, is brought to bear direct upon the projecting end of the wire piece, which by the pressure is upset and spreading laterally in the recess or mould is compelled to take its form. When button heads are required, the mould is formed by making a recess in the end of the heading punch corresponding with the desired form of the head. Arrangements are made whereby to adjust the heading punch to various sizes of screws. The four faces of the heading dies are shaped to form four separate sets of dies. After the heading punch has operated the dies open, and the finished blank is displaced by the end of the wire as it is again fed into the dies.

2nd. In the machine designed for nicking and turning the heads, the blanks are inserted in a series of holding dies, circumposed round the periphery of a die wheel, which is mounted together with a ratchet wheel on the same axis, the number of teeth on the ratchet agreeing with the number of dies on the wheel, so that at each movement of the ratchet, the die wheel is moved a divisional part of a revolution, each move bringing the head of a fresh blank directly into position to be operated upon by a circular nicking saw, and at another point in the circumference of the wheel the blank heads in succession come opposite a horizontal turning spindle which carries four cutting tools, two of which act upon the top and the other two beneath the head. Previous to each onward movement of the wheel the spindle retires and the saw is raised, and after each successive movement the spindle and cutters advance and the saw descends, and they respectively shape and nick the heads of the blanks brought opposite them by the last movement of the wheel, the dies relaxing and the blanks falling out when they arrive beneath the plane of the axis of the wheel.

3rd. The machine for cutting threads on screws operates by means of a cutter fixed in the socket of a tool holder mounted in a lifting frame. The head of the screw-blank is held in the slotted opening of a chuck, attached to a flexible self-adjusting joint piece, secured in the leader end of a revolving spindle by a pin. The spindle is traversed by a guide tooth which is attached to the lifting frame and engages with a leader screw whilst the tool is cutting, the leader screw being connected with the spindle, and the screw shaft supported by revolving rests. To complete the thread on each blank several cuts are required; these are regulated by a graduator, the frame being lifted by a cam after each cut to disengage the cutting tool and the guide tooth from the leader whilst the spindle is returned into position to recommence the cut, the last cut by the action of the graduator being so light as simply to burnish the screw. The screws may be made with gimblet points, and may be either parallel or tapering.

[Printed, 5*s*. Drawings. See Rolls Chapel Reports, 7th Report, p. 183.]

A.D. 1837, March 28.—N° 7331.

HALEY, Joseph.—This invention relates to mechanical tools designed for cutting, planing, and turning metal and other substances, consisting,—

1st. Of a self-acting apparatus for trimming and shaping the sides of nuts, giving them a bright, square, and accurate finish, and making them relatively equal in size and form, whether square, hexagonal, or other polygonal figure. This machine operates by means of a circular cutter, the periphery and outer face of which are serrated with cutting edges; this cutter is fixed on the end of a mandril, which is mounted in a headstock similar to a lathe. The nuts are secured in horizontal position on a vertical arbour mounted upon a pedestal, which by suitable mechanical appliances is made to traverse to and fro across the front of the cutter, and after each successive advance is caused to revolve by the action of the machine a portion of a revolution regulated by a dividing plate, so that at the next advance another side of the nut is brought into contact with the face of the cutter, and so on until all the sides of the nut have been duly shaped; it is then removed from the arbour by a boy, and another placed thereon, the machine requiring no further attention.

2nd. Relates to those mechanical movements in planing machines which regulate the motions of the tool and the tool carrier or holder.

3rd. Consists of a peculiar contrivance adapted to turning lathes, for throwing by means of eccentric bushes the back gear of the lathe headstock in and out of action.

[Printed, 1*s.* 4*d.* Drawings. See London Journal (*Newton's*), vol. 14 (*conjoined series*), p. 137; Rolls Chapel Reports, 7th Report, p. 184.]

A.D. 1837, October 5.—N° 7441.

WHITWORTH, JOSEPH.—This invention relates to improvements and appliances adapted to mechanical tools and apparatus, designed for "turning, boring, planing, and cutting metals and "other materials," comprising,—

1st. An improved mode of driving the face-plate or chuck of a lathe by means of movable friction rollers.

2nd. Employing in drilling machines, "screw or worm wheels "in connection with friction rollers for giving an advancing "motion to the spindle."

3rd. An improved mode of applying, in planing machines, the friction rollers to the guide screw for driving the table, and a new mode of moving the socket for reversing the cutting tool.

4th. Self-acting apparatus applicable to screw-bolt machines for shifting the strap upon the driving pulleys for the purpose of reversing the action of the spindle which carries the shaft or bolts upon which the thread is being cut.

5th. Apparatus applicable to wood screw machines, for driving and reversing the spindle which carries the screw-blank whilst the thread is being cut, and also an improved mode of driving the cam shaft of the machine.

6th. Employing in key grooving or slotting machines a series of cutters relatively fixed in a direct longitudinal line at intervals laterally projecting from a slotting bar, each one in succession protruding beyond the first, so that instead of cutting a slot by the successive descents of one cutting tool requiring to be moved after each cut, the slot by having a series of cutters is cut out by one descent of the bar.

The 3rd, 4th, and 5th parts of this specification are supplementary improvements to machines described in the specification of a former invention, for which Letters Patent, dated June 11th, 1835, No. 6850, were granted to this patentee.

[Printed, 4*s.* 8*d.* Drawings.]

A.D. 1838, April 24.—Nº 7623.

POPE, Francis.—This is an invention of machinery designed for making pins, bolts, nails, and rivets. Two of these machines are exhibited in the drawing, so placed side by side, that the operating parts of both machines are actuated by one main shaft, which is lineally connected to the crank shaft of a steam engine, obtaining motion direct therefrom; and the steam boiler furnace and flues are arranged for heating the metal bars out of which the bolts, etc. are to be made, the machines being adapted to make bolts, etc. of large size and perform heavy work, their action being alternate, and one machine a counterpart of the other.

The heading punch or die of each machine is attached or suspended by short links to the short end of a lever, the fulcrum pin of which rests in bearings upon an upright standard which is fixed to the bed plate, the long end of the lever of each machine respectively alternately being raised by anti-friction tappet rollers, mounted to revolve between discs fixed on the main shaft. Fixed near the fulcrum on each lever is a shear plate which by means of a fixed cutter on each standard respectively cut pieces the required length for bolts etc. from the heated rods. These pieces are placed vertically in the bottom dies, which in each machine are fitted into a sliding block which, when the bolt piece is placed in the bottom dies, is moved forward under the heading punch, and after the latter has descended and formed the head on the bolt piece, is withdrawn by the arms of a rocking lever, which obtains its motion from a rod attached to a square frame that encompasses the main shaft, and is made to reciprocate motion by a tappet roller, which is carried round by a disc. After the sliding die block of each machine has moved from under the respective heading punches, the headed bolts are forced up and removed by triggers, and fresh bolt pieces are inserted in the dies, which respectively consist of two parts, one forming a tube to receive the shank, and the other the enlargement or head, the shape and size of which is determined by the forms respectively of the dies and heading punches, which enter the top of the dies and upsetting the top of the bolt pieces force the metal to spread laterally into the remote parts of the dies.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1838, November 8.—N° 7862.

WOODYATT, Thomas Mayos, and HARRISON, Samuel.

This invention relates to machines for worming or cutting the threads on wood screws, and for surfacing the heads. These machines are in some respects similar to the head-stocks of a lathe, and several are mounted on a longitudinal bed. Instead, however of the rotary motion being continuous, arrangements are made for reversing the motion, so that the movement of the screw-blank under operation alternates to and forth between the dies until the thread is finished. The dies are formed at the ends of two steel bars, which are mounted in suitable holders formed respectively on the upper ends of a pair of vertical levers, which have their fulcra nearly together on two pins fixed in a transverse part of the frame or bed. The lower free ends of these levers are linked, near its fulcrum, to a horizontal lever, one end of which carries a weight, and the other end a stirrup, which opens the dies when pressed down by the attendant's foot, the weight acting to keep the dies with sufficient convergent pressure in contact with the screw-blank whilst the thread is formed. The blanks are held by a pair of holders fitted to the end of the main spindle, and they are fed into the machine by a slide moving between two guides.

The threading dies, as formed on the ends of the steel bars, have every other thread removed, and they may be conveniently sharpened or reforged and recut without deteriorating the metal, which is not the case with ordinary dies.

A machine, modified in some of its details, is employed for facing the heads of screws or screw-blanks.

[Printed, 1*s*. 8*d*. See Repertory of Arts, vol. 2 (*new series*), p. 257.]

A.D. 1838, November 13.—N° 7869.

HOLMES, John.—This invention relates to a mode of forming the moulds for casting in metal, studs, buttons, nails, tacks, and other articles. The process employed consists in fitting to each moulding frame or box a plate in such manner that if the moulding boxes were brought together, the two plates would occupy a place between them. Temporarily fixed in separate order to the under-side of the plate which covers the lower box, are semi-models of the buttons or articles to be cast, and to the upper-side of the plate which covers the under-side of the upper box, the other halves of the models are in like manner attached in such position, as exactly to correspond if the two plates were placed together. The boxes are then filled with sand, which is so pressed upon the half models, that when the plates are lifted off, the impressions of the buttons or articles are left in the sand, the intermediate plain surface of the plates leaving two even surfaces on the sand, which come together when the plates are removed and the boxes are placed in position for casting. Between the semi-models, shallow ribs with lateral branches are fixed on the plates to form channels or gutters in the sand for the running metal, and thus is formed a general communication between the moulds.

The two plates are made to carry different sets of models of any form corresponding to the buttons, nails, or articles to be cast.

[Printed, 8*d*. Drawing. See Repertory of Arts, vol. 15 (*new series*), p. 75; London Journal (*Newton's*), vol. 14 (*conjoined series*), p. 379.]

A.D. 1839, January 29.—N° 7953.

HILLARD, John.—(*A communication*).—" Certain improve-" ments in machinery or apparatus for making or manufacturing " screws."

[No Specification enrolled.]

A.D. 1839, March 14.—N° 8001.

COLLIER, Elisha Haydon.—This invention relates to a machine devised for forging or making nails, and to the dies employed; also to a machine for heading nails, and to a mode of cooling dies.

1st. A machine for forging and shaping nails. This machine operates by means of narrow revolving rollers made in parts screwed together and having their peripheries so correspondingly grooved and recessed at regular intervals as to give the heated nail rod, when it is passed between them the form of a series of headed nails severally tapering to a point and joined head and point in succession together. These rollers are fixed on axis mounted in a suitable frame, they act together as revolving dies, and their speed is made uniform by tooth gearing. The machine contains two pairs of dies, which are kept cool by streams of cold water flowing upon them from pipes.

2nd. Relates to the construction of the dies, which are made in separate parts screwed together. The central parts of each of the revolving dies consist of two steel discs, the contiguous edges of which are irregularly chamferred at divisional distances, the form of each division representing longitudinally one half of a diagonal section of a nail. These two discs with side plates and gearing are concentrically bolted together, and being mounted on an axis, constitute one of the dies; and the other die being constructed in the same manner, they can, in the event of damage from wear or otherwise to any of the parts, be separated, the damaged section renewed, and the dies reconstructed.

3rd. A duplex machine designed for forging nails from heated nail rods, by means of two pairs of chap dies, alternately operated by an intermediate cam. The two outer dies of this machine are fixed to the frame and the companion dies respectively oscillate horizontally on vertical centres; they are alternately forced into contact with the fixed dies by the eccentricity of the configuration of the cam, and after having compressed the ends of the rods, respectively projected between them by rotating feed wheels, they are opened in readiness to repeat the operation, by the reaction of springs.

4th. A machine for heading nails, which are severally placed in succession in a series of holding dies, and carried round to the heading die by a revolving die holder. The heading die is carried by a lever arm, and is forced down in succession upon the thick ends of the nails, which project from the dies, by tappet rollers carried on the face of a disc wheel, that is fixed on the driving shaft. This wheel by gearing at intervals with the die holder is made to rotate intermittently, and stop whilst the header operates.

5th. Describes a method of conducting unheaded nails or brads into the heading machine, from the shaping dies or rollers.

[Printed, 2*s*. Drawings. See Inventors' Advocate, vol. 1, p. 84.]

A.D. 1839, March 18.—N° 8005.

RYLAND, THOMAS HENRY.—This invention, relating to wood screws, comprises various mechanical appliances adapted to their manufacture; these consist as follows:—Instead of making screws with only a single thread for each turn, the dies have so coarse a pitch, as to include two or three threads in a turn instead of one, the object being to induce the workmen to use the screw driver only, instead of using the hammer, which is often used first when so many turns are required.

Describes an apparatus which, by a process of rolling between two disc surfaces, reduces the burr on the edge of screw heads; one of the surfaces is stationary and the other revolves, and both plates are furnished with an annular groove in which the screw heads roll round, the shanks projecting radially.

Communicating motion to two spindles, employed in carrying screws whilst being wormed, by means of pinion wheels, which engage with two segmental racks attached to and vibrating with a lever, which is actuated by a crank.

An improved tool for threading screws; a kind of compound chasing tool with cutting teeth, one of which is made to slide. This tooth takes the lead and cuts away the principal portion of the metal, whilst the other teeth follow and give the perfect form and finish to the screw, the sliding tooth being capable of removal for the purpose of being ground.

An apparatus for holding screws whilst the heads are polished with emery, commonly called "bobbing." The screws are in succession pushed into one end of a tube, which is connected to another tube that revolves at a high speed, and is furnished with three holding springs at its free end; the screws push each other through the tubes, and by turns are held at the exit end of the springs, whilst the emery is applied.

[Printed, 8*d*. Drawings. See Inventors' Advocate, vol. 1, p. 99.]

A.D. 1839, April 23.—N° 8048.

EDMONDSON, WILLIAM, and EDMONDSON, JAMES. — This is an invention relating to machines designed for separately performing one or other of the processes required in the manufacture of wood screws; these comprise,—

Certain appliances adapted to the apparatus known as the lever heading machine, the object being to make the machine more productive, allow more time for placing the blank wire pieces in the heading dies, and lessen the labour of the attendant. The die holder with the dies wherein the piece of wire has been placed, is by means of a cam made to slide beneath the heading punch, and after the heading punch has operated is withdrawn and caused to rest whilst a fresh piece is placed in the dies, the latter being first partially closed by inclined planes, and finally closed beneath the header by means of a bell-crank lever actuated by another cam, the finished blank being thrown out of the dies by a pushing rod which is actuated by a tappet lever, the rod being tapered for the purpose of opening the dies.

A machine constructed upon the plan of an ordinary crank heading machine, excepting that in lieu of a crank, the header, which is raised by a forked lever, is operated by a cam or eccentric, the appliances described as adapted to the lever heading machine being also applied to this.

A rotary heading machine suited to perform light work. In this machine a number of blank pieces are placed in a series of dies, circumposed at equal divisional distances in the periphery of an intermittently revolving broad disc or die holder, mounted on a horizontal axis between the standard frames of the machine, and directly beneath the heading punch, which at the proper moment is brought down by a cam, and forms the heads in succession upon the blanks as they by turns rest beneath it during the stopping interval after each successive movement of the die holder, the heading punch after each operation being raised by a weight. The intermittent rotary movements of the die holder are caused by a ratchet wheel fixed on the axle of the die holder. The wheel is furnished with a series of notches corresponding with the number of dies carried by the die holder, and its motion by means of pawls and connecting levers is obtained from an eccentric cam.

A nicking machine, the principal novelty in which consists in the use of two circular plates fixed on axes which relatively slightly deviate from a straight line, so that whilst rotating, the surface of the plates, which are placed face to face and revolve at the same speed, come together above the plane of their axes, and separate below it, the surface of each plate being correspondingly furnished with a close series of radiating grooves, which pair together as the plates revolve and form dies into which the screw blanks are inserted, and the heads projecting are cut or nicked in succession by a circular saw, the plates slowly revolving.

Describes a machine for turning the heads of blanks. In this machine the blanks are held in radial grooves formed in the contiguous faces of two disc plates as described in the nicking machine, the discs revolving intermittently; bring at each stopping interval a fresh blank directly between two cutting tools, fixed in holders mounted on the end of a revolving mandril. The cutting tools are caused to approach each other and recede by toggle jointed levers connected to a sleeve, which is made to slide on the spindle by an inclined wheel. This machine may, by substituting threading dies or tools in place of the turning tools, be made to act as a threading machine.

Two threading machines are described and illustrated. The first machine contains a horizontal spindle mounted in pedestal bearings, and made capable of revolving in either direction by means of two strap pulleys, which run loose upon the shaft. One of these pulleys is driven by a crossed, and the other by a straight strap, and, according to the desired direction of motion, they are respectively by means of a tappet made to engage with a clutch, which has liberty to slide longitudinally upon the spindle, but is compelled to revolve therewith. The master screw is attached to the back end of the spindle, and passing through a fixed nut causes the spindle whilst revolving to move endwise. The fore end of the spindle carries a chuck for holding by the head the screw or bolt during the threading operation.

The second machine acts by means of a hollow vertical spindle made capable of rotating in either direction by means of two loose pulleys actuated in the same manner as in the first machine. The lower end of the hollow spindle is furnished with a pair of grippers or blank holders, which are opened and closed by toggle-jointed levers that obtain motion from a cam. The master or leader screw is on the upper end of the spindle, and works through a nut attached to the standard frame. The blanks are fed point downwards into the top of the spindle, and gravitate by degrees to the bottom, being detained in succession by the grippers whilst the thread is cut, the dies being adjusted on a table directly beneath.

[Printed, 3*s.* 2*d.* Drawings. See Inventors' Advocate, vol. 1, p. 195.]

A.D. 1839, May 8.—N° 8064.

PROSSER, Richard.—(*A communication.*)—“ Certain improve-“ ments in machinery for making nails and screws.”

[No Specification enrolled.]

A.D. 1839, May 20.—N° 8070.

BODMER, John George.—This invention relates to improvements in mechanical “ tools or apparatus for cutting, planeing, “ turning, drilling, and rolling metal and other substances,” comprising,—

1st. A wheel cutting machine, capable of cutting worm wheels, bevel wheels, racks, wood pattern wheels; also a mode of constructing circular cutters in segmental sections.

2nd. Apparatus for turning and cutting the steel cutters employed for cutting the teeth of wheels and racks; cutting spherical concave or convex surfaces on metal; apparatus for equalizing the threads of screws; expansible mandrils, borers, and rimmers.

3rd. Constructional arrangements of a planing machine capable of working with two cutting tools, one as the table moves forward taking the roughening cut, and the other the finishing cut as the table returns, the tools being alternately taken off the cut by a special arrangement of mechanism.

4th. Constructing and working planing machines.

5th. Nut cutting engine, whereby the square or hexagonal sides of a number of nuts can be cut at the same time. Also various appliances adapted to slide and screw-cutting lathes, comprising a peculiar construction and application of the guide-screw nut, to prevent play in the brackets or nut; a novel arrangement of the tool slide for bringing the tool in and out of action when employed in cutting screws, and an apparatus for cutting the threads of nuts upon the slide lathe.

6th. A drilling machine; a tapping and screwing machine; mode of securing cotters, and various details connected with drilling, slotting, and screw cutting.

7th. A rolling mill for rolling parts of boilers and other tubes and cylinders, thereby dispensing with the subsequent operations of rivetting or welding. An extension of the patent right for this last part of the invention was granted for 5 years.

[Printed, 5*s.* 2*d.* Drawings. See Inventors' Advocate, vol. 2, p. 184; Moore's Privy Council cases, vol. 8, p. 282. Extended for 5 years (with Disclaimer).

A.D. 1839, October 3.—N° 8232. (* *)

CUTLER, Job.—"Certain improved combinations of metals to "be used for various purposes." Various alloys composed of copper ("best selected or tough cake"), zinc ("foreign"), lead ("blue lead of commerce"), iron ("scrap or malleable cast-iron"), and antimony are described. I. By combining 40 parts of copper with 40 of zinc and 20 of lead, an alloy is produced, which may be used like brass, and will roll hot. II. A more costly alloy is formed by mixing 40 parts copper, 20 zinc, and 5 lead. III. A hard alloy is formed by mixing 40 parts copper, 50 zinc, and from 10 to 20 parts of lead. The lead must be "killed." This is done by taking say, 56 lbs. of lead, and melting it in a closed furnace, having a pipe to carry off fumes; when melted, from 4 to 6 oz. of arsenic are added, and resin and sawdust are thrown on the surface, and after about half an hour are well stirred in the lead; if it have not lost its ductility about 1 lb. of common salt may be mixed therewith. The killed lead is added to the copper; when the mixture is melted from 4 to 6 lbs. of calamine are added to about 100 lbs. of the mixture; when all are well fused the zinc is added. The "pot is stopped down" with coke dust, and after about 10 minutes about "2 oz. of sal enixum of borax" are added, for 30 lbs. of mixture. The mixture is kept at a bright red heat for 5 minutes, then run into moulds. When equal parts of copper, zinc, and lead are to be combined the lead is first melted, and the zinc added. The mixture is run into ingots or sheets, and broken up. The copper is then fused with calamine, in the proportion of 6 or 10 per cent. of the combination, and the zinc and lead are added thereto and well stirred. When the alloy is made into sheets it is rolled at a bright red heat. IV. 40 parts of copper, 40 of zinc, 14 of lead, and 6 parts of iron (by preference, tin plate scrap,) form a good alloy. Scrap sheet iron may be used or cast malleable iron, and an ounce of tin should then be added for every pound of iron. Take of copper 38 lbs., scrap tin 12 lbs., melt them in a casting pot, add 12 oz. of metallic antimony, and fluxes, as pounded glass, sal enixum, or borax, and ¼ oz. "of turpeth mineral." When the mixture is quite fluid add an ounce of sal ammoniac, close the pot, keep it at a white heat for 10 minutes, stir it, and run it into "sows." Zinc may be added to the first mixture, but it is better to remelt it and add it afterwards. Equal quantities of the zinc and mixture will make brass.

For making cast nails, bolts for ships, and engine and mill brasses, take 14 lbs. of copper, 2 lbs. 8 oz. of Cumberland or malleable cast iron, 2 lbs. 8 oz. of zinc, and 1½ oz. of tin, and 3 oz. of metallic antimony. Melt first the copper and iron, and add fluxes; then melt the compound with the zinc and tin; ½ oz. to 1 oz. of antimony should be used with 1 lb. of iron, or nickel may be used in lieu thereof. If zinc and lead be alloyed with copper and iron, the two latter are first combined, and the zinc and lead are added as in process IV.

The articles made from the above combination are to be annealed.

[Printed, 4*d*. No Drawings. See Inventors' Advocate, vol. 2, p. 227.]

A.D 1839, October 24.—N° 8246.

NEWTON, William.—(*A communication.*) — This invention, relating to the manufacture of wood screws, consists of several different machines, each designed to perform in succession one of the operations required in the manufacture, viz., cutting off the lengths of metal wire and heading the same so as to form screw blanks; turning or smoothing the heads and shanks; cross nicking the heads; and cutting the screw threads on the shanks; and also an apparatus for feeding screw blanks to the turning, nicking, and threading machines.

Into the machine which cuts off the wire and forms the screw blanks, the wire is drawn from a coil by a pair of grooved feeding rollers actuated intermittently by a ratchet and pawl, and is projected through a hole in the frame to between a pair of open dies, sufficient wire protruding through the dies to form a head to the blank. By means of toggle levers the dies are made to close upon and grip the wire, and by a lateral movement of the dies the length held by them is cut from the coil by a fixed cutter in the frame and one of the dies, which has a cutting edge. The lateral movement of the dies brings the projecting end of the cut off piece directly opposite a heading punch, which is also advanced by toggle jointed levers; this punch upsets or compresses the end of the piece, compelling the metal to take the form of a screw head, by forcing and spreading it into a countersunk recess formed by the ends of the two dies; the dies then open, and the finished blank is pushed out by the end of the coil, which is again projected through the dies.

The feeding apparatus consists of a hopper into which the blanks are promiscuously thrown; at the bottom of the hopper are two drum rollers, each of which is furnished with lifters which are projected radially from its periphery by springs; whilst the drums revolve slowly these lifters raise the blanks and cause them to adjust themselves in a hanging position between two plates, the shoulder formed beneath the heads resting on their top edges; thence the blanks by means of a sliding rod and tooth are advanced along a curved passage or grooved way to the operating parts of the machines engaged in the turning, nicking, and threading processes, the machines being severally fitted with the apparatus.

The machine which turns or smooths the heads and shanks operates by means of a sliding file bar which, whilst the blank is held by a chuck fixed on the end of a revolving mandril, is brought to bear upon its head and shank.

The nicking machine operates by means of a circular saw. The screw blanks are received from the grooved way of the feeding apparatus, and point first are pushed by a spring slider in succession into recesses formed in the periphery of a wheel, where they are held by a spring plate; as the wheel moves round slowly, the blanks by turns are cut across the head by the saw, and they afterward fall out of the recesses when, as the plate relaxes its hold, they come beneath the axis of the wheel.

The threading machine operates by means of a circular cutter or saw or file, the axis of which is placed to revolve in a line parallel with the axis of the blank, the cutting edges of the saw file incising the blank whilst the latter revolves; the blanks during the operation are held by a pair of gripping dies fitted to the end of a hollow revolving mandril, through which the blanks are fed, pushing each other through the mandril, and by turns into the dies.

[Printed, 4*s.* 2*d.* Drawings. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 73; Inventors' Advocate, vol. 2, p. 292.]

A.D. 1839, November 12.—N° 8269.

POOLE, Moses.—(*A communication.*)—This invention relates to a machine for making forged nails, bolts, and spikes, combining the cutting off from one side or end of a plate of metal portions or strips, each suitable for a nail, and shaping and pointing such pieces by means of rollers or dies, the machine being also capable of forming the heads. This is an upright machine, the heated plate being presented by the workman or otherwise to the cutting shears, which are mounted at its upper part and take off in succession pieces from the end of the plate corresponding in size to the length and breadth of a nail. These pieces in rotation are by a forcing slide pushed down a tube, seized by holding levers, and compressed whilst passing between two plain forging rollers, which are carried by the roller levers. These forging rollers are caused to approach each other during the passing between them of each nail, and thereby they give to the latter severally a tapering or wedge form with a chisel point. The nails after passing the rollers are severally held by a pair of holding dies, whilst the head is formed by a heading die or punch.

[Printed, 1*s.* 2*d.* Drawings. See Inventors' Advocate, vol. 2, p. 339.]

A.D. 1840, January 21.—N° 8354.

ROWLEY, Charles, and WAKEFIELD, Benjamin.—This invention relates to machinery and tools for cutting, stamping, or forming and piercing, shells and backs for buttons, washers, and other articles out of thin metal plates. The first machine described is similar to a fly press with a double action, the upper die being caused to descend by means of a right-handed screw worked by a fly lever, and the under die to ascend at the same time by a left-handed screw and fly lever, the two levers being connected and moved simultaneously in the same direction. The dies or cutters, whether for forming buttons, button shells, backs, or washers, require to have the necessary form, the hole or holes being pierced or cut out at one and the same operation. Other machines are elaborately described and illustrated in full detail, motion being given to the operative parts by cranks and otherwise, including an apparatus for smoothing the edges of flat circular articles.

A stamping machine which operates by means of a ram or heavy hammer falling between vertical guides, is also described.

[Printed, 3*s.* 4*d.* Drawings. See Mechanics' Magazine, vol. 33, p. 205; Inventors' Advocate, vol. 3, p. 84.]

A.D. 1840, March 19.—N° 8438.

JACKSON, John.—This is an invention of a power hammer to be used for forging nails, nuts, bolts, and rivets by means of dies. The lower die which forms the shanks is fitted into the upper surface of an anvil, and the upper die which forms the heads, is fitted into the lower end of a weight or hammer block. This block is raised between vertical guides by means of two endless chains, which are stretched over two chain pulleys or wheels mounted on axes, one at the top, and the other at the base of the machine, the latter carrying either a handle or fast and loose plain pulleys to receive a strap when power is applied. The chains, at intervals corresponding to one third of their length, are united by cross bars, which, as the chains revolve, catch hold of pieces projecting from the hammer block, whereby it is raised to a certain height and disengaged, thence falling upon the anvil, when the two dies come together and form the head to and mould the bolt, a fresh piece of iron rod in a heated state being placed in the lower die every successive lift of the hammer head.

[Printed, 10*d*. Drawing. See Repertory of Arts, vol. 14 (*new series*), p. 263; Mechanics' Magazine, vol. 33, p. 349; Inventors' Advocate, vol. 3, p. 228.]

A.D. 1840, June 2.—N° 8531.

STOCKER, William Southwood.—This invention relates to machinery for forging and cutting nails and articles, and to divers machines adapted to perform the subsequent processes of heading pins, rivets, nails, and spikes, and to cutting brads. It consists—

1st. Of a forging machine wherein the forging tools are combined in a frame moved longitudinally to-and-fro in guides by a connecting rod coupled to a crank on the main shaft. Four strong bars form opposite sides to the frame, and transversely fitted to slide through these side bars, are bolts that severally carry at their inner end a forging roller, and at the outer end a friction roller, and as the frame moves to and fro the friction rollers run in contact with fixed inclines, causing the forging rollers, which act in pairs, to converge and compress the heated end of the rod, which is introduced through a tube fixed lineally with the centre or axial line of the frame, to which line each pair of the rollers converge. The forging rollers are severally grooved, and as the frame moves, each pair acts as revolving swages, reducing the end of the rod which projects from the tube, to the required size, and by this means the stems of large bolts and pins may be drawn out and made round or of other desired form. For forging square bolts, the swaging rollers employed have plain surfaces, and when chisel points are forged to spikes, the pairs of forging rollers are respectively caused to revolve by tooth wheels, which engage with fixed racks.

2nd. Machine for heading rivets and pins. The heated end of the metal rod out of which the rivets, etc. are to be made, is inserted between the open jaws of a pair of shears into a holding die and cut off by the closing of the shears, which immediately afterwards open to make way for a heading die carried on the end of a helve or lever arm, which is actuated by a connecting rod coupled to a crank on the main shaft. The end of the lever moves between curved guide plates, and the heading die strikes upon the end of the cut off piece held in the holding die, which contains an internal bolt that is thrust forward by a cam at the proper moment, and is made to push the finished rivet out of the die.

3rd. Machine for heading spikes or nails. This machine is similar in most respects to the last, excepting that the holding die is in two parts, each suitably grooved to receive and compress the tapering form of the spike, etc. One part of the die is fixed, and the other part moves or oscillates on a fixed centre and is acted upon at each end alternately by two revolving cams, one for closing and the other for opening the dies after the head is formed.

4th. Machine for heading pins and rivets. This machine drives forward the slide which carries the heading punch by means of a cam mounted on the main axle of the machine, loosely whereon is a tooth wheel, which is brought into action by a sliding clutch. The pieces of heated metal previously cut from the rods are presented in succession to the heading die by the workman, in holders with handles, of which a number are provided.

5th. Machine for cutting small nails or brads transversely from the ends of a series of narrow metal plates or bands. These narrow plates are placed in a series of six tubes, horizontally disposed in parallel position side by side; on the end of each tube there is a small tooth wheel, and these wheels engage with a tooth rack that slides a limited distance to and fro transversely beneath the tubes, which are thereby caused to turn backwards and forwards half a revolution in accordance with the motion of the rack. The bottom cutter is fixed inclining from a right angle across the machine, deviating only sufficient to ensure a tapering form for the pieces cut off the bands; the top cutter works in vertical guides, and both cutters have ample width to reach across and cut from all the bars simultaneously, the top cutter being operated by toggle jointed links, actuated by a connecting rod coupled to a crank on the main shaft. After each cut the series of tubes which hold the bands are turned over half a revolution, the successive cuts, by reason of the inclining position of the cutters, tapering alternately from the opposite edges of the bands. After each cut the holding tubes are advanced by a suspended weight.

[Printed, 3s. 8d. Drawings. See Mechanics' Magazine, vol. 33, p. 606. Inventors' Advocate, vol. 4, p. 20; Engineers' and Architects' Journal, vol. 4, p. 56.]

A.D. 1840, November 17.—N° 8705.

WHITWORTH, Joseph, and SPEAR, John.—This invention relates to mechanical tools or apparatus designed for shaping metals and substances, and consists of,—

1st. Apparatus for cutting screws, comprising stocks and dies capable of cutting a screw thread to any required depth, the dies having themselves been cut by a master tap double the depth of the thread larger in diameter than the rod or shaft on which the thread is to be cut, the object being "one of great practical "importance," viz., to "secure the formation of a true thread," the improvement involving an "alteration in the general form of "the dies," and "a change in the direction in which they are "moved up."

2nd. "An improved hand planing machine."

3rd. "An improved slotting machine."

4th. Supplementary improvements on the slotting bar for which Letters Patent dated October 5th, 1837, No. 7441, were granted to Joseph Whitworth.

5th. Improvements on the lathe, comprising, 1st, an apparatus attached to the headstock or mandril frame, for the purpose of forming, in conjunction with the change wheels, a better communication between the mandril and the guide screw, the lathe being capable of reversal, and the mandril of revolving without giving motion to the wheels or the screw. 2nd, an improved arrangement of the constructional and operative parts of the large slide lathe described in the specification of certain other Letters Patent granted to Joseph Whitworth, and bearing date August 7th, 1839, No. 8188.

6th. "Self-acting apparatus for truing up the wheels of car-"riages and locomotive engines during their progress along a "line of railway."

[Printed, 2*s*. Drawings. See Mechanics' Magazine, vol. 34, p. 430, and vol. 37, p. 464; Inventors' Advocate, vol. 4, p. 341; Engineers' and Architects' Journal, vol. 4, p. 234, and vol. 5, p. 373.]

A.D. 1840, November 19.—N° 8707.

STIVENS, ALEXANDER.—This invention relates to a universal chuck adapted to lathes for turning and boring purposes, and applicable to screw-cutting engines, holding nuts during the tapping operation, and to drilling, slotting, planing and shaping machines. This chuck consists of a flat circular case furnished with a back central boss for attachment to the lathe spindle or otherwise. It holds the articles concentric with its own centre by means of three radially sliding dogs or dies, which are fitted into radial slotted openings cut 120° apart in the front or face plate; the dogs are caused to converge or diverge simultaneously by means of three short connecting links, jointed respectively at one end to the dogs and at the other end to the three arms of a triangular plate, which is caused to move a portion of a revolution concentric with the centre of the chuck by means of a screw; or, the ends of the links may be jointed on studs trigonally fixed in the face of a disc worm-wheel, which is moved round by a worm. Another modification, consisting of two sets of connecting links and two triangular plates is described. The chuck may be arranged to hold the articles eccentrically.

[Printed, 8*d*. Drawing. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 351; Mechanics' Magazine, vol. 34, p. 431; Inventors' Advocate vol. 4, p. 341; Engineers' and Architects' Journal, vol. 4, p. 234.]

A.D. 1840, November 25.—N° 8720.

BATHO, NATHANIEL.—This invention relates to novel constructional arrangements of mechanical tools.

1st. A planing machine, capable of cutting whilst the table and article being planed moves either in a forward or in the reverse direction. This is effected by forming and shaping the tool with two cutting edges, back and front, and allowing it limited liberty to vibrate, so that the two cutting edges are alternately tilted into a cutting position when the motion of the table is reversed.

2nd. Lathe, slide-rest, and slotting apparatus. The lathe spindle or headstock centres are placed as backward as possible, and the gearing is brought to the front. The saddle which carries the slide rest is moved by means of askew wheels. Two tool boxes or carriers are provided with slide motions at the back and front of the carriage or saddle for cutting screws, or sliding backwards or forwards, and an arrangement is described for converting an ordinary slide lathe into a slotting or morticing machine.

3rd. Screwing machine, wherein certain apparatus is applied for moving the cutting dies to and from the work or article on which they operate, by means of right and left-handed screws and nuts fast upon the die plate.

4th. Drilling and boring machine with an improved contrivance for raising and lowering the drill spindle, or the boring bar.

5th. The nut squaring and grooving apparatus consists of a simple piece of mechanism with dividing plate, and spindles that hold the nuts in rows whilst being trimmed or squared by the cutting tool, which is fixed upon the end of the lathe spindle, the apparatus being mounted on a slide rest.

[Printed, 2*s*. 10*d*. Drawings. See Mechanics' Magazine, vol. 34, p. 460; Inventors' Advocate, vol. 4, p. 359.]

A.D. 1841, January 30.—Nº 8822.

COATES, EZRA JENKS.—(*A communication.*)—This invention relates to a machine designed for manufacturing bolts, spikes, and nails, combining operative parts and apparatus or dies for forging the heads and drawing out the points, and for cutting or slitting by means of circular cutters, heated metal plates into suitable strips, rods, or pieces, which are made to follow each other between a pair of spring levers whereby they are held during the heading and pointing process. The heated plates are thrust into a hopper which has a spring side, and they are in succession brought into contact with the cutters by a rammer operated by a weighted lever; as the pieces are cut off they pass side by side down a guiding trough, and are thence forced forward into holding dies, consisting of two side dies, a back die, and a front holding die, the shaping of the shank being effected by the back die, and a roller or curved die which (requiring to be lubricated for the purpose) by a sliding pressure, has the effect of drawing the metal to a point. The heading die is suitably recessed to mould a head of the required form, and it comes into operation whilst the nail piece is securely held by the dies; after the heading process the parts relax, and the finished article is expelled by means of a spring piece, which draws down the front die. The dies are made of tempered steel or chilled iron, and the main shaft of the machine is, by means of strap pulleys, actuated by motive power.

[Printed, 4s. 4d. Drawings. See Mechanics' Magazine, vol. 35, p. 174; Inventors' Advocate, vol. 4, p. 87, and vol. 5, p. 84; Law Journal (Chancery), vol. 10 (*new series*), p. 248.]

A.D. 1841, February 8.—N° 8835.

RYDER, William.—This invention relates to a machine designed for forging, hammering, or forming spindles, bolts, nuts, rollers and similar articles, by hammers, swages, or dies, fitted into the lower ends of a series of vertical slide bars, which are caused with rapidity to move up and down by a series of eccentrics formed at intervals on a horizontal shaft, disposed in a series of suitable bearings across the upper part of the machine, one bearing between each eccentric, and the shaft is set in rapid rotation direct from the motive power. The short quick vertical movement derived from the eccentrics is imparted to the slide bars respectively by intermediate short loose connecting pieces, which at their lower ends are suitably formed to fit and rest in semicircular recesses formed across the tops of the slide bolts, and at their upper ends are made hemispherically hollow, wherein the lower half of the eccentrics respectively revolve. The eccentrics are formed on the shaft relatively at different angles, whereby they are made to follow each other in their action, and cause the hammers or swages to strike in succession and not simultaneously. The slide bolts are raised by the reaction of springs. The lower swages, hammer blocks, or dies, according to the nature of the work, are fitted in a solid part of the frame, respectively in a vertical line and directly beneath the swages, hammers or dies carried by the slide bars, and the iron under process whether for bolts, nuts, spindles, or otherwise, is taken hot from the furnace by the workman and held resting upon the bottom swages, and is shifted from one pair to another whilst the upper swages rapidly operate and reduce the end of the rod to the desired form and size.

Printed, 8*d*. Drawing. See Repertory of Arts, vol. 17 (*new series*), p. 352; London Journal (*Newton's*), vol. 19 (*conjoined series*), p. 270; Mechanics' Magazine, vol. 35, p. 188, also vol. 61, p. 557; Artizan, vol. 9, p. 162; Inventors' Advocate, vol. 5, p. 101. Extension applied for, but not granted.]

A.D. 1841, April 3.—N° 8912.

BODMER, John George.—This invention relates to the construction of screwing stocks, taps, and dies, and to a variety of mechanical tools adapted to cutting and working metals. The screwing stock contains a guide die, which fits into a circular recess wherein its turning is prevented by a key. The cutting die is forced up to its work by one of the stock handles, it has two cutting edges or angles, and is so fixed in the die box of the stock, that it has liberty to vibrate as on a centre, and so to bring either of its cutting edges into operation, according to the direction in which the stock is turned, the opposite cutting edge rising, so as to be clear of the screw under process of being cut. A mode of regulating the play or motion of the cutting die is shown and other modifications are exhibited, and also the section of a stock containing two cutting dies. These dies are confined in the stock chamber between two plates, and by sliding laterally are made to act in the same manner as the vibrating die.

The taps are first finished nearly to the right measure in a screw cutting lathe, and are placed in a tap cutting lathe to be finished. The action of the chasing or cutting tool in this lathe is regulated by a shaper plate, and the form and mode of constructing the chasing tools and tool holder is described.

Describes an apparatus for regulating screws which during the regulating operation in order to prevent expansion, are partly immersed in water contained in a horizontal trough.

Describes a tool employed for the purpose of constructing crank and connecting rods, also

A lathe adapted for turning steam engine cranks. A universal link. Mechanical arrangements for regulating and reversing the tools in slotting machines. A double drilling machine. Self-acting face plates and chucks. Small planing machine. A mode of imparting motion to the tables of planing machines. An improved starting and reversing apparatus. A mandril press, drifting, and punching machine, and the mode of constructing screw racks.

[Printed, *s.* 8*d.* Drawings. See Mechanics' Magazine, vol. 35, p. 318; Inventors' Advocate, vol. 5, p. 228.]

A.D. 1841, May 4.—N° 8946.

BERRY, Miles.—(*A communication.*)—This is an invention of machinery for making nails or brads, which are cut from the end of a narrow plate or bar by the alternate action of two pairs of cutters, the metal being either in a heated or in a cold state. The cutters, one of each pair, are mounted respectively on two reciprocating levers which are connected by a link, and have their motion through a short connecting rod from a crank on the main shaft, which carries a fly wheel and a pair of driving pulleys. The cutting ends of the cutters point to the fulcra of the levers, and as the latter oscillate, the cutters of each pair alternately meet and operate upon the flat rod, cutting and forming the heads of the nails alternately from its opposite edges, the form and length of the nails or brads produced depending upon the shape of the cutters and the breadth of the rod.

[Printed, 1*s.* 2*d.* Drawings. See London Journal (*Newton's*), vol. 20 (*conjoined series*), p. 206; Mechanics' Magazine, vol. 35, p. 398; Inventors' Advocate, vol. 5, p. 310.]

A.D. 1841, July 28.—N° 9036.

NEWTON, William. — (*A communication.*) — This invention relates to a machine adapted for making pins, and pin nails. Five successive operations are required in the manufacture, and in the machine are combined the necessary apparatus for performing them. These consist of the feeding apparatus, forming the heads, cutting off the shank, pointing the shanks, and discharging from the apparatus the finished pins.

The wire is fed into the machine from a contiguous reel, is drawn, straightened, and advanced at intervals in regulated lengths by a pair of pincers carried by a slide, to which a to-and-fro movement is imparted by a cam, and a cutter which also serves the purpose of a guide for the wire, cuts therefrom the required length; the slide introduces the wire pieces successively as they are cut off, into the perforated or hollow spindle of one or other of a series of twelve "wharves" or small pulleys, circumposed at equal divisional distances round a circular plate, to which a rotative intermittent motion is imparted by a ratchet and pawl; the small pulleys revolve on their axes independent of the movements of the plate, and the end of each wire piece which projects through the end wharve spindle, is held by clamps or jaws whilst a head is formed upon it by a suitable punch which operates twice, the jaws forming between them a recess or die into which the punch penetrates. After the heading operation, the pins by the successive movements of the revolving plate, during the stopping intervals, are by turns brought into contact with the pointing apparatus, which consists of two or three revolving grinders or circular files, that operate against the ends of the pin pieces which project from the other end of hollow spindles of the revolving wharves, and are supported against the pressure of the grinders by suitable rests. After the pointing operation the pins are drawn in succession out of the wharves by a guide, which is fixed on a reciprocating carrier.

When the machine is adapted for making pin nails, a modification in the cams and other subordinate parts is required.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1841, August 4.—N° 9042.

WARREN, James.—This invention relates to a machine or apparatus for making moulds for casting screws of malleable cast iron, such being subsequently annealed by heat whilst imbedded in Cumberland pounded iron ore. The principle of action in the machine, which contains a series of models or patterns of screws, consists in screwing all the screw models simultaneously into the sand, and then unscrewing them, thereby leaving cavities or moulds in the sand corresponding to the shape of the screw-models. The moulding boxes containing the sand, are severally caused to travel on rollers directly under the machine into a fixed position beneath the ends of the models, which are vertically arranged through guide holes in plates placed a sufficient distance apart to insure steady action, the holes in the upper plate being tapped, and the models carrying threads to correspond. On the upper end of each model screw is a crank arm, and these arms revolve the models, which descend and ascend whilst entering and leaving the sand, each model respectively passing through a shallow projection fixed on the under-side of the bottom plate which, when the latter is pressed upon the sand form impressions for the heads.

A memorandum of alterations dated March 23rd 1843, is printed with the specification.

[Printed, 10*d.* Drawing. See Repertory of Arts, vol. 1 (*enlarged series*), p. 142; Mechanics' Magazine, vol. 36, p. 125.]

A.D. 1841, November 11.—N° 9155.

ONIONS, John.—This invention, relating to the manufacture of nails and screws, consists—

1st. In making the moulds for casting iron nails with heads variously shaped, by a system of plate casting. One moulding plate carries the shank models, which are fixed at equal distances in rows, projecting from its under surface; this plate answers to any number of head plates severally carrying models of heads of different styles or form which are fixed thereon at distances corresponding exactly with the arrangement of the shanks on the shank plate, so that when impressions are made in the sand of a pair of moulding boxes by the plates respectively, and the two boxes are afterwards brought together, a series of moulds is formed, the plates carrying ridges to form gutters and branches for the running metal.

2nd. Casting metal screws complete with perfect threads and nicks across the head. Plates carrying semi-models of screws divided longitudinally, are employed in conjunction with a templet to make the moulds, the screws being cast on their sides, ranged in rows connected by gutters; the nicks are formed by the edge of a metal plate, which is placed in the mould.

3rd. Casting chain in lengths for cables, of Lorn or Cumberland iron carefully annealed. These moulds, instead of being in two, are made up of four separate parts, and the chain is cast in convenient lengths so as to link to the last link of the made chain, which is introduced into one end of the mould.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1841, December 24.—N° 9210.

KETTLE, William Robinson, WAKEFIELD, Benjamin, and CROSHER, William.—This invention relates to the manufacture of bolts to be used for building and other purposes. These bolts are of two kinds, either hollow or solid, respectively formed with heads, and slit up a certain distance from the points. The hollow part of the bolt extends from the head to the slit, and after such bolts are driven, the point is caused to open or expand in the wood or material by means of a metal wedge piece, which is then driven down through the hollow part of the bolt. The slit in the end of a solid bolt is formed partially open, and before it is driven into a hole, a wedge piece is previously placed therein, which causes whilst the bolt is being driven home, the further opening and final expansion of the divided point.

The divided points of some bolts are so fashioned that the expansion will take place whilst they are being driven, without the aid of the wedge piece.

[Printed, 6*d*. Drawing.]

A.D. 1842, January 27.—N° 9238.

GALLOWAY, William, GALLOWAY, John, and HALEY, Joseph.—This invention relates to machinery adapted for cutting, punching, and compressing metals. The machine described is double-acting, being furnished with two counterpart sets of apparatus worked simultaneously, and capable every successive revolution of the main shafts which carry the actuating cams and tappets, of turning out two finished rivets or bolts. The operations of the machine comprise a cutting movement, for separating from the heated ends of rods taken by the attendant alternately from a contiguous furnace, pieces in length determined by adjustable gauge stops against which the ends of the rods are pressed, and held whilst cut off by a kind of rocking lever carrying two cutters; the pieces falling alternately towards the separate sets of apparatus respectively at the opposite sides of the machine, are held in position by receiving dies during the operations respectively of the heading punches, which in accordance with their style or form determine the shape of the heads of the bolts or rivets. After the heading process the finished articles are forced out of the receiving dies by sliding bolts. The softening or deterioration of those operative parts of the machine, viz., the cutters, receiving, and heading dies, which are brought into contact with the heated metal, is prevented by jets of cold water, directed upon them after every successive round of operations.

[Printed, 1*s*. Drawings.]

A.D. 1842, May 23.—N° 9357.

MABLEY, William Tudor.—(*A communication.*)—This invention relates to machinery or apparatus for cutting and heading nails, and consists:—

1st. In combining with the cutting-off apparatus two heading tools, one on each side of the machine, the cutters which take the transverse strips from the end of the narrow plate being intermediately placed. The cutters have considerable breadth, and a to-and-fro lateral motion is given to the narrow plate so as to present its end to the cutters at alternate angles, and thereby feed both the heading tools with tapering pieces of uniform size, corresponding to the required length of the nails, a clearer being employed to relieve the dies, whilst a forward movement is imparted to the plate every cut by the feeding apparatus.

2nd. Relates to a peculiar method of cutting, for the use of shoemakers and joiners, bills or brads, from plates of metal. For this purpose two pairs of cutters are employed, the first pair cutting the plate with a serrated or otherwise formed edge, and the second pair with a plain cut taking off the edge, which consists of a series of bills or brads.

3rd. Relates to certain modes and apparatus for feeding nail-cutting machines by means of a revolving screw having longitudinal motion, and to turning over the strips of metal by means of a grooved cylinder.

The several parts of the invention are fully described and illustrated.

[Printed, 3s. 10d. Drawings. See Record of Patent Inventions, vol. 1, p. 307.]

A.D. 1842, September 8.—N° 9463.

NEWTON, William Edward.—(*A communication.*)—This invention relates to four separate machines, designed to perform the successive processes required in the manufacture of wood screws and rivets, consisting of—

1st. Machine for making the screw-blanks. This machine cuts the wire into pieces of a uniform length and forms heads thereon, it is also adapted for making rivets. The coil of wire out of which the screw blanks are made, is hung upon a pulley and the end is drawn at intervals by the action of the machine through straightening rollers, by grooved feeding rollers, which grip the wire and by means of a rachet wheel intermittently project it in regular lengths into a tubular guide, which conducts it to the gripping or shaping dies. These dies have each four sides of equal width, which are severally grooved to act in pairs, and fit to different sizes of wire, the different dies being brought into operation as occasion may require. The rear end of the grooves in each die are countersunk so as severally to form round the wire when the dies are closed, a recess wherein the head of the blank is moulded when the metal is spread laterally by the heading die, the motion of which is obtained from a crank through an arrangement of toggle jointed levers, the length of action of the heading die being made adjustable by an intervening wedge. One of the gripping dies is fixed and the other is mounted in a frame, which rests in a recess in the machine bed, and has a crosswise sliding action in face of a fixed cutter, whereby the pieces are severed from the rod. The blank is allowed to escape from the dies by the temporary removal of the gauge piece.

2nd. A machine for trimming or shaving the heads of blanks, which during the process are held by a pair of holding jaws, mounted on the end of a revolving mandril which contains a sliding bolt with a wedged-shaped end that, when required to close the jaws, is forced between their arms by an arrangement of levers and cams. The cutter is mounted on the end of a tilting lever, and is advanced laterally against the head of the blank by a cam, which by raising the long end of the lever brings the cutter into operation, the action being made adjustable by a screw, and the gradual advance of the cutter due to the paracentricity of the cam. The apparatus is self-acting throughout.

3rd. A machine for removing the burrs from under the heads of screw-blanks. In this, like the last machine, the blank is held by jaws on the end of a revolving mandril containing a sliding bolt that opens the jaws, and which by means of a lever, in this machine is operated by hand. The cutting tool and its appurtenances are mounted on an adjustable slide which is fixed to the machine bed, the operating edge of the tool being shaped to the required angle.

4th. A machine for worming or cutting the screw-threads on screw-blanks, which are successively fed and removed from the machine by hand. Unlike most machines of this class, the main spindle is disposed vertically in an upright frame, the head of the screw-blank being fixed in the socket of a holder fitted on the lower end of the spindle. The spindle whilst the cut is being made is raised at a speed regulated to the required pitch of the screw by a horizontal inclined cam. The action of the cutter is regulated by the operation of a frustum-formed conical cam or scroll on a lever, and the threaded part of the screw tapers towards a point, the cuts being repeated until the thread is developed. The cutting sides of the cutter are so grooved as to be able to cut simultaneously at both sides of the thread and finally to cut the edge.

[Printed, 4*s.* 4*d.* Drawings.]

A.D. 1842, November 8.—N° 9516.

ZANDER, Hinrik.—This invention relates primarily to steam engines, boilers, and furnaces, methods of feeding and working, and to propelling by steam; and incidentally to rivets and screw bolts which, after they are fixed, are made to constitute safety valves or mediums tending to prevent the explosion of steam boilers. These rivets have the form of ordinary rivets, and they are made and fixed in the usual way of upsetting and spreading the point by hammering or otherwise. After they are fixed in their places, the axis or body of the rivet is perforated longitudinally from the outside of the head by a boring tool, which forms a cavity through half its length, and according to the quantity of metal cut out, so is the strength and resisting power of these rivets reduced, but in order that the general strength of a boiler may not be impaired, an additional number of rivets are to be used in its construction. It is expected that in cases when the boiler is subjected to undue pressure, that these rivets will be the first to yield, and that explosions will be prevented by the gradual opening of the lap joints or seams. Screw bolts employed for securing the lap joints of boiler plates and the fixing of stays, are to be treated in the same manner. The abridgement of the other parts of the invention will be found in the "Steam Engine" series.

[Printed, 1s. 6d. Drawings.]

A.D. 1843, February 21.—N° 9641. (* *)

BLACKWELL, Benjamin Brunton, and NORRIS, William.—The title of this invention is as follows:—"An improvement "in coating iron nails, screws, nuts, bolts and other articles "made of iron, with other metals;" and the invention relates to coating iron with copper by galvanic agency.

The improvement consists in rendering the iron surface "much "less electro-positive to copper, less liable to oxidation, and in a "better state for receiving a sound, firm, and ductile coating of "copper," either by case-hardening the articles of iron, or by previously coating them with lead or an alloy of lead. The articles may be case-hardened by subjecting them to a red heat in a crucible or iron box, in contact with parings of hoof or horn, or bone-dust; the case-hardened surface should be thin, otherwise small articles are liable to be brittle. Articles are coated with lead or its alloys by immersion in the molten metal "in "precisely the same manner as is known and practised for cover-"ing iron with tin." The alloys of lead that may be used are—lead and tin—and lead, tin, and antimony. The iron goods may be placed (whilst hot from the preparatory process) in a solution of copper, in the galvanic circuit, the battery being kept at 80 or 100 degrees of Fahrenheit's thermometer.

[Printed, 4*d.* No Drawings. See Repertory of Arts, vol. 3 (*enlarged series*), p. 363; London Journal (*Newton's*), vol. 26 (*conjoined series*), p. 16; and Mechanics' Magazine, vol. 42, p. 108.]

A.D. 1844, February 17.—N° 10,056.

HOOD, John Lionel.—(*A communication.*)—The object of this invention is to produce a ductile metallic compound capable of being rolled out for ships' sheathing, and adapted also for making ships' bolts, nails, and other fastenings. The compound mixture or alloy consists of copper, zinc, and lead, variously proportioned, to which may be added a small quantity of antimony, tin, or iron. The metallic proportions for fourteen different mixtures are given for producing compounds of different densities, to be employed in the manufacture of rods, bolts, nails, sheets and similar articles, suitable for marine and other purposes. In all these the proportion of copper varies from 40 per cent. in some to 49 in others, the object being to produce a cheap ductile compound more economical than either copper, or what is known as yellow metal, for sheathing and for bolts and nails, and yet to contain a sufficient proportion of copper to render the surface of the plates susceptible of oxidation at sea, and thereby poisonous by the formation of the cupreous salts, which resist the attack and adhesion of barnacles and other marine animals.

The copper is first melted in a suitable furnace, and when completely fused, the due proportions of the other metals are added in small quantities, in order not to cool the copper, care being taken to keep the zinc below the surface, and thereby prevent its volatization. While rolling and working the metallic compound it is necessary to keep it at a red heat.

[Printed, 4*d.* No Drawings. See London Journal (*Newton's*), vol. 25; (*second series*), p. 306.]

A.D. 1844, February 21.—N° 10,065.

COATES, Ezra Jenks.—(*A communication.*)—This invention relates to a machine for forging bolts, spikes, and nails, from pieces of iron cut transversely from narrow plates which, heated to the required degree for forging, are in that state fed into the machine between holding dies, and pieces the size required for making the kind of article in process, are cut off every successive movement of a cutter die plate, which co-operates with the edge of one of the dies. After each piece is cut off it is held between three dies during the pointing and heading operation, the cutting die plate forming one of the holding surfaces. The heading die formed according to the figure it is desired to give to the heads of the nails or spikes, is adjustably fixed on the upper surface of a lever, and the end of the nail piece, having by the pressure of a rod been slightly projected from the ends of the dies, is upset by the heading die and compressed thereby into the form of a head. The tapering and pointing of the shank is effected by a roller die whilst the nail or spike piece is held by the three dies, the roller die passing towards the opposite end is caused to press upon and draw out the metal to a tapering point, means for regulating the shape being provided, such being capable of adjustment.

A modification of the machine differing only in mechanical details is also described and illustrated.

[Printed, 4*s.* 2*d.* Drawings.]

A.D. 1844, March 6.—N° 10,091.

WALKER, Bernard Peard.—An invention of machinery for making wrought-iron nails. The machine, first described, cuts transversely, slightly deviating from a right angle, by means of a pair of vertical action shears, from the end of the narrow plate or nail rod, pieces of metal of tapering form suitable for nails, the chief novelty of the process consisting in feeding the bar to the shears, and causing it by the action of the machine after each cut, to make half a turn backwards and forwards alternately, so that the head or shank of each successive nail piece thus cut off, comes from the opposite side of the nail rod or narrow plate, the holder rising whilst the bar is turned. The machine is driven by steam or other power.

A modification of the above machine is described, which somewhat differs in the action and mechanism, the narrow nail plate whilst turning over being caused to rise.

[Printed, 1*s.* 2*d.* Drawings. See Repertory of Arts, vol. 5 (*enlarged series*), p. 314; Engineers' and Architects' Journal, vol. 70, p. 370.]

A.D. 1844, July 24.—N° 10,271.

HALL, Joseph.—This invention relates to the manufacture of horse-nails, by stamping or cutting them out of sheet iron properly prepared by rolling, and then subjecting them to an annealing process. One of the rollers employed for preparing the plates carries a plain surface, and the other, at intervals corresponding to the length of a nail, is longitudinally grooved, and in one direction from each groove, in order to vary the thickness of the plates and give the necessary tapering form to the nails when cut therefrom, the surface of the roller is gradually reduced. The grooves in the roller form transverse projecting ridges on the plates, which are then cut into strips, the ridge being left on the thickest edge of each strip. Crosswise from these strips by means of suitable dies the nails are stamped, each nail having a portion of the ridge which forms the head. The nails are then subjected to the annealing process, and thus brought to a proper condition to bear hammering and sharpening by the blacksmith.

To save the point of the cutting die, an enlargement is formed at the end, producing a circular or other shaped piece at the point of the nail, which piece is afterwards removed.

By employing rollers properly prepared to act as revolving dies, the rolling and punching processes are combined.

[Printed, 6*d*. Drawing. See Repertory of Arts, vol. 5 (*enlarged series*), p. 71; Mechanics' Magazine, vol. 5, p. 109.]

A.D. 1844, September 19.—N° 10,323.

VIEYRES, Antoine.—This invention relates to machinery, so arranged for cutting nails, "that strips or narrow sheets of metal " are cut in opposite directions, without requiring the narrow strips or sheets of metal to be turned over, which is performed " by arranging a series of cutters on the periphery of a wheel or " revolving surface, in such manner that they alternately cut " the larger parts or heads of the nails from the opposite edges of " the strips or narrow sheets of metal, the succeeding cutters " making their cuts at opposite inclinations." The cutters, of which twelve are shown mounted in oblique slots formed at equal distances apart in the periphery of the wheel, are fixed to cut alternately at different angles, so that the pieces transversely taken off the end of the rod, taper the first cut from one side, and the next cut from the other and so on, and, acting in conjunction with these cutters, is an underneath cutter, which has a reciprocating lateral sliding motion, beneath the end of the rod, and two cutting edges respectively at angles that correspond to the two angles at which the alternate cutters on the wheel are set.

[Printed, 3*s.* 4*d.* Drawings.]

A.D. 1844, September 19.—Nº 10,324.

NEWTON, William.—(*A communication.*)—This invention relates to machinery designed for making pins for domestic use, and capable of producing wire nails, rivets, and screw blanks. The description given refers exclusively to the manufacture of pins, from a length of wire coiled upon a reel, whence by the intermittent action of the machine, it is drawn and straightened in the usual way, and passing through to-and-fro sliding guides, is projected every forward move into a pair of holding dies, sufficient of the end of the wire protruding beyond the dies in the first instance partly to form a pin head when upset by the heading punch. So soon as the wire passes between, the holding dies close, and the heading punch is forced forward by a cam on the main shaft by means of an intervening lever. The holding dies then relax their hold on the wire, which is again moved slightly forward by the sliding guides, so as to supply an additional quantity of metal to form a perfect head to the pin, which is done after the holding dies again close, by the second advance of the heading punch. The pin length is then severed from the wire by a steel cutter fixed to the end of a lever, the cut being made contiguous to the stationary guide.

When desired, the pins may be pointed in the same machine, and in such cases, instead of falling from the holding dies into a receptacle placed beneath, they are received by a conducting apparatus, formed by two plates placed sufficiently apart for the shank of the pins to drop through and, hanging by the heads in a row they slide down an inclining way in a channel formed between a reciprocating sliding bar and a stationary ledge, the respective contiguous faces of which are covered with leather for the purpose of causing the pins to revolve whilst the points are ground by a rotating mill or grinder which, by means of bands and pulleys is rapidly made to revolve, and whilst revolving the axle of the cutter is made to vibrate vertically, in order that the points of the pins may have the required conical form. During the pointing operation the pins are gradually caused to move forward by giving to the sliding bar a slight additional move in the back direction, pending which time the pins momentarily cease to revolve. Thence the pins fall into a trough or inclined passage, and finally become ranged side by side in a row a regular distance apart, when a plate which is brought down upon the heads by a plunger, forces the whole row through the plaited edges of a folded strip of paper, pressed together by a cam.

When the machinery is adapted to the making of wire nails, rivets, and screw blanks, the constructive arrangements and mode of operating are the same, but the size of the parts must be necessarily increased, and be made proportionately stronger.

[Printed, 2*s*. 8*d*. Drawings.]

A.D. 1844, October 29.—N° 10,369.

FULLER, Thomas.—This invention consists in combining, in one machine, a variety of apparatus, capable of performing the several processes of turning, boring, sliding, screw-cutting, and cutting the teeth of wheels. The machine is a kind of compound lathe, with headstocks and gearing, slide rest, and slides, tool holder, and carriage mounted on a cast-iron bed supported on standards in the usual way, and having the several operating parts so arranged, as to be capable of being thrown out of gear and separately employed. The wheel cutting and screw cutting apparatus, is attached to the back of the headstock frame, and is provided with a regulator screw, for moving the tool carriage by means of a clasp nut when screw cutting, the screw acting simply as a shaft when sliding or turning, and in such a way the clasp nut being thrown out of gear, that the threads of the screw are not used excepting when during the process of cutting screws. The circular cutter employed for cutting the teeth of metal wheels, is mounted on a vertical spindle actuated by a worm and worm wheel and carried by a slide, and when forming wooden cogs, a fly cutter cottered in another spindle is substituted.

[Printed, 1*s*. Drawing. See London Journal (*Newton's*), vol. 26 (*conjoined series*), p. 373.]

A.D. 1844, November 25.—N° 10,403.

DORR, Ebenezer May.—(*Partly a communication from John Miller.*)—This invention relates to the manufacture of horse-nails. Ordinary rods of nail iron heated to a welding heat, are passed between narrow rollers which have side flanges to prevent lateral expansion whilst the metal is longitudinally drawn out by the process. The surface of one of the rollers, at intervals corresponding to the length of a nail, has grooves across in the direction of its axis, and these grooves as the heated rods pass between the rollers, raise solid projections on the rod; these projections are intended to form the heads of the nails. The rods thus prepared, are afterwards operated upon by a punching press, furnished with steel dies in two parts accurately fitted, and made adjustable by means of screws. The prepared rods in a cold state are so introduced between the dies every stroke of the machine, that the projections come into the enlarged part of the dies, whereby sufficient metal is provided for forming the heads. After this cutting process the nails are made ready for use by the ordinary process of annealing.

[Printed, 1*s.* 2*d.* Drawings.]

A.D. 1845, January 11.—N° 10,457.

GRIFFITHS, Robert.—This invention relates to machinery adapted to the manufacture of bolts, railway pins, spikes, and rivets. Two machines are described, one working by means of two sets of heading dies fixed in the ends respectively of a curved oscillating lever, which obtains motion from a crank, and the other machine operating by means of two hammers, carrying dies respectively for roughing and finishing.

As regards the first machine, in each of the ends of the oscillating lever are set two or three heading dies, which co-operate by turns with a bottom die carried by a horizontal slide. The bolt pieces in a heated state are in succession placed in the bottom die which, by means of a lever that moves the slide, is brought forward directly under the first heading die; after this die has operated, the slide and bolt piece is advanced under the second, and then under the third die, and in this manner by the successive operations of two, three, or more dies, the heads on the metal pieces are formed, constituting bolts, spikes, rivets, or otherwise, according to the shape of the metal pieces and the configuration of the dies. The machine is capable of relieving itself from undue strains.

Two hammers in the second machine operate by turns on the metal pieces by means of two pairs of swaging dies, respectively carried, one half of each pair by the hammers, and the other halves by an anvil disposed in front of the machine. The machine may either be actuated by motive power or by hand, the hammers respectively, one for roughing and the other for finishing, being when required to strike, brought into gear by means of treadles, pressed upon by the workman's foot.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1845, September 11.—Nº 10,828.

COLLIER, ELISHA HAYDON.—This invention relates to the manufacture of nail iron, to the making of nails, and to machinery or apparatus adapted to such purposes. In respect to the preparation of the iron, it consists of welding together bars of iron placed side by side, and rolling the welded mass in such manner, that the grain of the plate whence the nails are to be cut, may run crosswise or in the direction of the length of the nails.

The rolling and nail cutting machine mounts three pairs of rollers, which in succession operate upon the plate. The first pair, which have smooth surfaces, reduce the plate to the required thickness. The second pair have at regular intervals longitudinal grooves, which leave ridges across the plate to form the nail heads, and between each groove the surface of these rollers is so gradually reduced, as to produce a varying thickness of the plate from groove to groove, and thereby give the tapering form to the nails, when the plate is divided lengthwise into strips by the third pair or splitting rollers, which are furnished with a close series of annular shears or cutters, each strip corresponding to the breadth of a nail, and representing a string of nails joined heads and points together, afterwards to be separated by cutters.

Describes another rolling machine for preparing plates with longitudinal ridges, wherefrom nails are to be cut transversely in strips, by cutters with serrated edges. Describes also cutting machines, and amongst other modifications a machine for heading nails.

[Printed, 1*s*. Drawing.]

A.D. 1845, September 26.—Nº 10,839.

NEWTON, ALFRED VINCENT.—"Certain improvements in " machinery for manufacturing screws."

[No Specification enrolled.]

A.D. 1846, February 18.—Nº 11,098.

ROBERTSON, JOSEPH CLINTON.—(*A communication.*)

This invention relates to a machine for making nails from heated iron rods. Three operations are combined in the machine, (viz.) pointing the rod by means of two pairs of segmental rollers acting in concert alternately on opposite sides of the rod, successively cutting off the lengths corresponding to the required size of the nails, and finally heading them. The rollers in pairs are mounted at right angles, and have their rotations so regulated by gearing, that the two steel segments which they severally carry on their peripheries, are caused to come into action by turns in pairs, one pair acting at the top and bottom, and the other alternately at the sides, and both opposite a common center, each pair in succession taking in the rod, which is withdrawn immediately by the action of the machine in time for the successive operation of the other pair. The point of the nail being formed, another rod is presented to the rollers, the former being received and held by a pair of chaps whilst being cut off and during the heading process, which is effected in the machine by means of a punch or die, corresponding to the form required to be given to the heads.

[Printed, 1*s*. Drawing.]

A.D. 1846, March 11.—Nº 11,131.

VAUX, Thomas.—This invention relates first, to a method of fixing the front calker on horse shoes, and secondly, to a provision in the process of making horse nails, whereby the nails may be withdrawn singly without injury to the foot.

Two modes of fixing the calker are devised; one by means of a pin, which secures the calker in a recess formed beneath the front of the shoe to receive it, and the other plan of fixing consists in sliding the calker into a dovetailed groove, made across the front part of the bottom of the shoe, and fixing it there by means of a key or wedge.

The horse nails have the ordinary form and size, excepting that at one side beneath the head there is a recess made to receive the end of a strong instrument, the point of which is fashioned to enter a countersink in the shoe and engage with the shoulder formed by the recess under the head of the nail; the instrument resting upon the shoe acts as a lever, and singly upraises the nails, which are then easily drawn from the hoof.

[Printed, 6*d*. Drawings. See London Journal (*Newton's*), vol. 29 (*conjoined series*), p. 234; Patent Journal, vol. 1, p. 277.]

A.D. 1846, May 5.—Nº 11,196.

NEWTON, Alfred Vincent.— (*A communication.*) — This invention relates to a series of machines designed for the manufacture of wood-screws. These machines perform in succession one or other of the processes required in the manufacture.

1st. Cutting the wire into the required lengths for screw-blanks and forming heads thereon. The wire is fed into the machine which is double acting by an adjustable reciprocating grooved segment and a pressure roller, alternately into two pairs of gripping dies, which hold the pieces whilst they are severed from the coil and by turns present them to the heading punch, which upsets the end of the wire and forces it into a recess partly formed in the end of each die and constituting a head mould, the shape of which, the metal when forced up by the punch is compelled to take. The feeding apparatus, die holder or step, shears or cutters, and the gripping dies are actuated by appropriate arms, shackle bars, and levers, and the heading punch receives motion from a crank.

2nd. Turning or trimming the heads of screw-blanks. In this machine the blanks are presented in succession to the holding jaws by a pair of conveying fingers, and whilst the cutter or trimming tool operates upon the top and beneath the head, the blanks are supported by a rest. The trimming tool is mounted in a stock which, by means of adjusting screws is made capable of adjustment to operate on different sizes of screws, and means are provided for elevating or depressing the cutting point. The blanks are fed from a hopper having two inclining rollers which form the bottom; the blanks adjust themselves between the rollers and gradually move to one end of the hopper, where they are received by a delivery slide and pass thence in a vertical position points downward into a conductor.

3rd. Machine for nicking the heads, into which the headed blanks, arranged and delivered to conveying fingers, are fed by a similar kind of apparatus; the conveying fingers being mounted on a rocking shaft, draw the blanks from the conducting tube and present them in succession to the holding jaws, by which they are forced against the cutting edge of the circular nicking saw.

4th. Machine for cutting, chasing, or forming the threads on wood screws, into which the blanks from the lower end of a vertical conducting tube are fed by a pair of spring conveying fingers, which present them in succession to a pair of grippers jointed to a chuck on the end of a hollow revolving mandril, where through, a sliding rod, which opens and closes the grippers by means of a cam, is passed. The thread cutter or chaser is mounted on a slide rest which is carried by a chasing frame, provision being made for preventing any yielding of the shank of the screw whilst the cutter is operating, and for giving the requisite taper and point to the screw. The motion of the chasing frame is governed by a compound cam path or endless spiral groove, cut to run right and left round the circumferential periphery of a cylinder, the motion being so regulated in relation to the revolutions of the mandril, as to produce a regular pitch of the thread cut on the blank, proper provision in the construction of the tool holder being made for the adjustment of the point of the chaser in relation to the shank of the screw. By "means of this improved machine all the "operations of arranging the blanks in regular order, supplying "them one by one to the gripers, chasing the thread with any "desired taper and point, and discharging the chased screw, are "performed with no other human labour than is necessary to "keep the mechanism in order, and to throw a large quantity of "blanks into the hopper at given intervals."

[Printed, 2*s*. 10*d*. Drawings.]

A.D. 1846, August 31.—N° 11,363.

WARREN, James.—This invention relates to the manufacture of cast screws, and is supplementary to a former patented invention No. 9042, A.D. 1841, the specification of which describes a mode of making the moulds for casting screws, the guide screws and pattern or model screws being on one stem. According to the present invention, the guide screws and model screws are made separate, the lower ends of the guide screws having sockets, into which the stems of the model screws are cottered, so that any of the model screws may be easily replaced when worn or damaged; model screws of different patterns may be used with the same guide screws, and in order that the screwing apparatus may adjust itself correctly to the surface of the moulding box, the pressure is effected by means of a ball and socket joint. Instead also of screwing the whole length of the model screws into the hard rammed sand, the stems and heads are first moulded by a corresponding series of plain models, and afterwards the screw models sink the moulds to the required depth, moulding that part of the screws which carries the thread. The jets or sprays are made at the top of the screw heads, and the nicks across the heads are made by the edges of thin metal plates, which are imbedded in the sand of the upper moulding box.

[Printed, 10*d*. Drawing. See Repertory of Arts, vol. 9 (*enlarged series*), p. 240; London Journal (*Newton's*), vol. 30 (*conjoined series*), p. 176; Patent Journal, vol. 2, p. 682.]

A.D. 1847, March 10.—N° 11,620.

DE MECKENHEIM, Louis Nicolas.—(*Partly a communication.*)—This invention relates to divers machines designed for the manufacture of nails, screw-blanks, rivets, bolts, and pins, and to machines which, by a single rotation of the main shaft, cut the nail or other pieces from narrow bands or bars of metal, and hold them severally whilst, by means of suitable dies, heads are formed thereon, motion being given to the operating parts respectively by revolving cams.

Into the first machine described, the end of the metal bar, which is fed by hand and turned over after every successive cut, is advanced over the bottom cutter against an adjustable stop attached to the top cutter, which descends and cuts slantingly a triangular tapering piece transversely off the end of the bar, which piece is held by the stop and carried down by the cutter to a position opposite a pair of shaping dies, which advance and by compression give to it the desired form; the blank is then held by a pressing die whilst the head is formed by a heading punch, which retires immediately afterwards, and the finished nails falls out when the pressing dies open in time to receive the next piece which is cut off and brought down by the cutter.

Machine for making nails from narrow bars or bands which, previously by a rolling process, have ribs or ridges raised along each edge. This machine acts by means of a triple cutter and two heading punches actuated by revolving cams; the three cutters descend simultaneously, acting as one cutter, the centre, to form the shanks of two nails, cutting across the thin part of the plate, and the side cutters after cutting through the thick edges rise immediately, whilst the centre cutter, by means of an adjustable stop, carries the piece down into pressing dies which shape the shanks, the two nails laying point to point in the dies, whereby they are held whilst two heading punches advance from the opposite sides and compress the thick edges severed by the side cutters and form them into heads; the dies and punches then relax, and the finished nails fall out whilst the next piece is cut off and brought down by the middle cutter. Two modifications of this machine are described relating to the form and action of the cutters and dies.

Machine for cutting nails from strips or iron bands, which are presented to the cutters by feeding rollers moving intermittently each time a portion of a revolution, and having their surfaces minutely grooved for the purpose of more firmly grasping the metal bar; these rollers by means of a cam are made to oscillate endwise, in order to present the bar to the cutter of the machine alternately at different angles, for the purpose of giving to each piece successively cut off a tapering form.

Nail-cutting machine to which the feeding apparatus last described is adapted and so placed that the metal band or plate is presented somewhat obliquely to the cutter of the machine, and passing through a semi-revolving tube is turned over between each cut, so that every piece cut off has a tapering form, the heads being taken alternately from the opposite edges of the narrow plate; the shape of the nails depending upon the form and action of the cutters and the unequal thickness longitudinally given to the narrow plates by the rolling process. A modified arrangement of this machine operating by means of rotating cutters, is also described.

Describes a series of machines designed for either wholly or partially making nails by a rolling process from strips or bands of iron, the longitudinal section of the plate having the appearance of a string of nails joined head and point together, the bands being afterwards slit into narrow rods.

Describes various other machines for making nails, rivets, bolts, screw-blanks, and pins, from metal rods either previously prepared by the rolling process or otherwise.

Machines for making nails, rivets, bolts, screw-blanks, and pins, by rolling cut-off pieces of iron either between rollers or between a roller and a fixed surface.

Describes a variety of other machines consisting of:—

Machines for making wire nails, or "Pointes de Paris." The wire is fed an adjustable length for a nail into the machine and held whilst the head is formed by an advancing punch; the length is then cut off and the end compressed to a point, the design and action of the operating parts being susceptible of modification.

Machine for making wire nails whereby the compression of the shank, the formation of the point, and the cutting off is effected by one pair of tools, the nail when finished being removed by the action of the machine.

Machine in which the point of the wire nail is shaped, the length cut off, and the head formed by the same pair of tools. A modification of this machine gives to the point of the wire nail a wedge-like form.

A machine for making nails from wire and from prepared metal strips, the operating parts being so arranged and actuated that two nails are made during every revolution of the axis.

Machine for making nails, bolts, rivets, railway pins, and dressing pins, the wire or rod being fed by paracentric rollers; and the nails, &c. pointed by revolving files.

Machine for making wire or other nails, the heads being made by percussion, and the wire advanced and the pressure and cutting tools operated by special arrangements.

Machine for making rivets, bolts, screw-blanks, or pins, having a different mode of advancing and cutting off the wire or rod, and for discharging the finished article. Several of these machines are arranged on one axis.

Method of cutting wire into suitable lengths for nails, &c.

Machines for cutting sprigs from wire or strips of metal, several machines being arranged on the same axis.

Machine for making screws, the heads being made and nicked by the operation of the same machine, which acts on the rotative principle.

Describes three other machines for making screws, severally containing modified arrangements for making and nicking the heads in the same machine. In one of these machines a straight nicking saw is employed. In another a fixed hemispherical saw, the blank holder revolving.

[Printed, 7*s*. 8*d*. Drawings.]

A.D. 1847, June 12.—N° 11,741.

JOHNSON, James. — This invention relates to machinery adapted to "the manufacture of rivets, railway and other pins, "bolts, nuts and spikes," and to an apparatus for cutting up rods into suitable lengths.

The heading die of the nail-making machine works through a vertical guide and is linked to the short end of a horizontal lever, the fulcrum pin or bolt of which whereon it moves freely being supported by two upright parts of the frame. The long end of the lever is raised twice every revolution of the main shaft by two friction rollers, free to revolve on studs fixed in the opposite sides of a wheel keyed thereon, and at each succeeding lift of the lever, the heading die is brought down by turns upon one or other of a close series of bottom dies, which are lineally arranged in a long sliding carriage or die holder. This die holder is caused to move with intermittent motion in a transverse guide across the machine, in either direction respectively by means of two ratchet wheels and pawls, each successive move bringing the bottom dies, wherein the bolt pieces are placed, by turns directly beneath the heading die. When the whole series have been acted upon, and the headed bolts or rivets replaced by fresh pieces placed in the series of dies, the same operation is repeated whilst the die holder intermittently returns.

The apparatus for cutting up rods into bolt or rivet pieces of a uniform length, operates by means of circular saws; the rods are pushed through a tube up to an adjustable gauge stop; this tube is fixed to a slide, and is nearly divided at regular intervals corresponding with the desired lengths of the bolt pieces, by a number of transverse saw cuts. The saws are mounted at corresponding distances apart on a mandril, and when about to operate, the slide by means of a lever is moved towards them; the edge of the saws enter the transverse cuts in the tube, and by forcing up the lever, they are made to pass through and cut the rod into the required lengths.

[Printed, 1*s*. Drawings. See Repertory of Arts, vol. 11 (*enlarged series*), p. 90; Patent Journal, vol. 4, p. 123.]

A.D. 1847, July 12.—N° 11,791.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—This invention relates to the manufacture of wood screws, and consists, first, in so making pointed screws that the several turns of the threads shall have the same pitch or distance apart along the whole length, including the parallel screw part of the blank and the tapering point, where the depth of the thread is gradually reduced. When such a screw is driven every portion of the thread has the same progress, the cut made by the thread on the tapering end being adapted in pitch to receive the thread on the body of the screw.

The wire is fed into the heading machine by a pair of reciprocating tongs a regulated length through the gripping dies, whereby it is held whilst a pair of shears cut off the required length, the front end of the cut off piece projecting through the dies, and the shear plate remaining against the back end to form a resistance to the force of the heading die, which acts against the projecting end; after this die has operated the gripping dies open and the headed blank is received by a pair of spring fingers and presented to a second heading die or gauge, into which it is forced by a punch. The edge of the second die trims off all superfluous metal from the edge of the head, which it leaves concentric with the stem. The blank is pushed out of this die by a rod, and carried by a second pair of fingers to a second heading die, and thence by fingers to a second trimming die, which finishes the heading operation, the four stages of which are carried on simultaneously on different blanks, which without intermission follow each other through the machine.

The headed screw blanks are fed into the threading machine by hand through an inclined tube, down which they gravitate pointed ends foremost, and during the cutting of the threads the blanks are held on the end of a hollow revolving spindle, which has a slit or spring conical recess to receive the head of the blank and a sliding thimble to secure it. The threads are cut by a chasing tool or tools and the pitch of the threads is regulated by the inclining face of a cam.

[Printed, 3*s.* 2*d.* Drawings.]

A.D. 1848, January 5.—N° 12,011.

LAMBERT, Charles.—This is an invention of machinery for making nails from heated rods, combining in successive operations the preparation of the rod, and the shaping, pointing, and heading of the nails. The rod first enters between a pair of segmentally divided rollers, the periphery of each division thereof being eccentric to their axes. These rollers act in conjunction by an intermittent motion, and reduce the parallel rod to a string or series of wedge pieces, each piece being formed into a headed and pointed nail, and is separated from the rest before leaving the machine. As the rod passes between the rollers it is conducted forward by movable guides to a pair of bevel-cutting and holding dies, which are adapted for slicing off horizontally a portion of the shaft of each of the nails as they come forward, thereby inclining them severally to a wedge shape on the upper side, corresponding to the form imparted laterally by the rollers. These dies hold the nail-piece firmly whilst it is operated upon by the heading punch, and a pair of double cutters close and cut off the finished nails in succession, at the same time trimming or taking off if required a portion of the head of the succeeding nails.

[Printed, 10*d.* Drawing. See London Journal (*Newton's*), vol. 33 (*conjoined series*), p. 229; Artizan, vol. 6, p. 226; Patent Journal, vol. 5, p. 173.]

A.D. 1848, November 7.—N° 12,321.

POOLE, Moses. — (*A communication.*) — This is an invention which relates in the first part to a machine combining the operation of slitting the nail iron into rods, and rolling such rods whilst in the heated state between rollers, one of which is so indented as to give to the rod a form similar to a string of wedge pieces, joined heads to point in succession together. The other parts of the invention relate to machines for working up the rods into nails, either in a heated or cold state.

Describes three of such machines, one machine for acting on the prepared rods either in a heated or cold state, another machine for working up the rods in a heated state, and the third machine for compressing nails in a cold state after the heads are formed. The two first named machines receive the rod in a groove, along which it is carried by the feeding apparatus and enters between two compressing dies or matrices. One of these matrices is fixed and the other movable, and each matrix acts at right angles on two sides of the nails, so that when the nail is between them it is compressed on all sides simultaneously. Cutters of the ordinary kind actuated by the mechanism separate the nails, and heading dies or punches finish the operation.

[Printed, 2*s*. Drawings. See Mechanics' Magazine, vol. 50, p. 450; Patent Journal, vol. 7, p. 58.]

A.D. 1848, December 28.—N° 12,392.

POOLE, Moses.—(*A communication.*) — This invention relates to a mode of constructing and applying screw fastenings adapted to the heels of boots and shoes and to a variety of other purposes, "and consists of making such fastenings of male and " female screws, so formed and combined that the male screw " having passed through the female screw, the stem of the " male screw shall alone remain in the female screw; the thread " or worm of the male screw then acting as a stop to prevent " the return of the male screw out of the female screw, unless " the two screws are acted on in a direction to separate them, " combined with a back movement." The parts of boot heels so fastened together will not readily separate, although one part will be capable of turning as on a plain pivot, or it may be fixed by a pin or stop in different positions so as to equalize the wear.

The invention is also described and illustrated as adapted to the frame of a bag, watches and watch chains, furniture castors, jointing pipes, and other purposes.

[Printed, 8*d*. Drawing. See Mechanics' Magazine, vol. 51, p. 16; Repertory of Arts, vol. 14 (*enlarged series*), p. 351.]

A.D. 1849, June 5.—Nº 12,629.

GOOSE, William.—(*A communication.*)—This is an invention of apparatus adapted to machines employed for making cut nails, and is for the purpose of partially turning over the nails previous to the operation of the compressing dies, whereby the dies are made to operate on the sides of the nails, which renders the metal more firm, instead of compressing them as heretofore on their edges, which had a tendency to open its fibres. This turning of the nail is effected by a springing nipper, during its passage from the cutters to the compressing or gripping dies. The springing nipper presses against the edge of each nail in succession at a point somewhat lower than that at which the opposite edge of the nail is supported by the fixed die, and the nails are thus brought into proper position as the compressing dies approach. As soon as these dies grip a nail, the springing nipper, by the action of the mechanism, is caused to retire into position for receiving the next nail as it is brought down by the cutter.

[Printed, 6*d*. Drawing. See London Journal (*Newton's*), vol. 36 (*conjoined series*), p. 160; Mechanics' Magazine, vol. 51, p. 547; Patent Journal, vol. 8, p. 128.]

A.D. 1850, January 12.—Nº 12,926.

GLASGOW, John.—This invention of machinery adapted for "shearing, shaping, punching, and compressing metals, consists :—

1st. "In the application of the expansive force or pressure of "steam, air, or other elastic fluid, to the operations of shearing, "shaping, punching, and compressing metals by means of the "direct action of the piston and piston rod of a steam or other "cylinder, and without the intervention of the machinery usually "employed for transmitting and applying such force."

2nd. Relates to such direct application of steam power to a machine adapted for forging or forming the heads of bolts, rivets, and spikes. This machine comprises four mechanical operations, viz., cutting off precise lengths from rods of bolt iron; properly placing and retaining, by means of a receiving die the pieces so cut off in position whilst being operated upon by the heading die; forming a head on the metal pieces by the heading die, which is carried at the end of a ram or piston rod attached to a piston, and worked to and fourth through a stuffing box at the end of a steam cylinder by the expansive pressure of steam, that drives the piston and ram forward, and forces the heading die against the end of the heated bolt piece, which is thereby upset by the pressure and compelled to take the form of the die; the ram after the heading operation is withdrawn by the admission of the steam into the opposite end of the cylinder. After the heading die has retired, the headed bolt is forced out of the receiving die by a "jingler," and the operation is successively repeated; those operative parts of the machine which are brought in contact with the heated metal are cooled by the flow of water. Instead of steam for working the piston, atmospheric pressure may be employed.

3rd. A machine for shaping and forming screw nuts. This machine combines the operations of cutting from the heated ends of flat bar or nut iron, square pieces or nut blanks in each of which is punched at the same time the central tapping hole. The moving shear or cutter and punch are attached to and operated by a vertical slide, motive power is applied to the machine in the usual way, and the shape of the nut blanks whether square, hexagonal, or otherwise is determined by the form of the cutter.

[Printed, 1*s*. 4*d*. Drawings. See Mechanics Magazine, vol. 53, p. 58; Patent Journal, vol. 9, p. 221.

A.D. 1850, June 1.—N° 13,089.

COATES, Ezra Jenks.—(*Partly a communication.*)—This invention, relating to the manufacture of bolts, spikes, and nails, consists in making such articles from common fender plate iron transversly cut into strips, in width suited to the length of the bolts or nails whence the latter are cut crosswise, the grain of the metal running in the direction of the length.

Describes the machine employed for cutting the nails, bolts, and spikes from the strips, shaping and heading them. The strips, fed in a heated state into the machine by a bell crank lever apparatus, are in succession brought under the operation of three cutters and a steel roll, which is slightly concave and proportioned to the size of the nail; this roll is carried by a small frame or roll head, and by means of an adjustable jointed plate or shape and a friction shoe, gives the required form to the nails, and is instrumental in forming the point. A wrought iron movable frame actuated by an eccentric, carries the steel headers, which may be changed to suit the style of head required. All the parts are described in detail.

Open passages through which cold water is caused to flow, are formed through those operating parts of the machine which come in contact with the heated metal, in order thereby to keep them in a cool state.

[Printed, 1*s*. Drawing. See Mechanics' Magazine, vol. 52, p. 459; Patent Journal, vol. 10, p. 140.]

A.D. 1850, June 12.—N° 13,134.

MANLY, John, Junior.—This invention, relating to making and ornamenting the heads of nails, consists :—

1st. By ordinary means in use, casting nails, or heads of nails with the intended form or style of the head partially produced, and finishing afterwards by pressure between suitably engraved dies.

2nd. Enveloping the heads of nails in thin metallic ornamental shells, which are fixed on by the pressure dies.

3rd. Tinning cast or wrought-iron nails, and brightening the surface by pressure or friction; also colouring such nails by tinning and laquering or otherwise.

4th. Stamping the heads of nails by dies, such nails or heads being previously for a short time immersed in soap and water and dried, the coating of soap causing the metal to spread more easily under the dies.

5th. Forming the heads of nails of horn or paper.

6th. Covering the heads of nails with a fabric or flexible non-metallic material, which is applied by the methods adopted in covering buttons.

7th. Covering the heads of nails with silk or other thread.

[Printed, 6*d*. Drawing. See Mechanics' Magazine, vol. 52, p. 499; Patent Journal, vol. 10, p. 176.]

A.D. 1850, July 23.—N° 13,187.

BOWER, Leonard, and FORTUNE, Thomas.—This invention of machinery for making screws, bolts, rivets, and nails, consists of :—

A machine for slitting or forming the groove across the heads of screws. The screw-blanks, supplied in regular order through guides by a feeding apparatus, are in succession received and held by forceps, whilst the groove across the head is cut by a circular saw.

A machine for turning the heads of screws is furnished with a similar feeding apparatus, whence in regular order the blanks are severally received by forceps, and presented in succession to holding dies, which rotate whilst the cutting tools operate upon the screw heads.

Machine for supplying blanks to the feeding apparatus.

The machine for turning screw-blanks is similar to the head turning machine, with the addition of a spring, which closes the levers carrying the cutting dies, and which will yield to any obstruction or derangement of the parts.

Describes the forceps employed in a worming and other machines; these, whilst opening and closing by the action of the mechanism, have reciprocating and other motions, which are modified to suit different operations.

Machine for making bolts and rivets from the metal rod, which is cut into pieces of the required length; these pieces are severally as they are cut off received into a die, and there held whilst by the action of the machine another, called the heading die, performs its operation.

Describes the dies employed.

[Printed, 1*s*. 4*d*. Drawings. See Mechanics' Magazine, vol. 54, p. 97; Patent Journal, vol. 10, p. 197.]

A.D. 1850, September 5.—N° 13,247.

WOODBRIDGE, FREDERICK.—An invention of a machine for making rivets, bolts and screw-blanks.

The main operation of this machine is effected by means of a metal disc, fixed through which relatively at equal distances is a circumposed series of dies. This disc mounted on a horizontal axis, receives limited intermittent motion sufficient to bring the several dies in succession opposite a pair of feeding rollers which, at every movement of the disc, thrust the end of the metal rod under operation into the die then in position to receive it, the rod resting on a cutter against which the surface of the disc revolves. This cutter and each die in succession, every movement of the disc act as a pair of shears, cutting off from the end of the rod pieces of regular length, which severally remain in the dies. Carried by a wheel on the same axis as the disc is a circumposed series of heading punches, one corresponding to each die, and by means of a bolt worked by an eccentric, the heading punches are in rotation thrust into contact with the ends of the pieces of metal in the several dies, thereby forming the heads; the next onward motion brings the die containing the last headed nail or rivet opposite a clearing punch, which, in succession each movement of the disc, forces a nail or rivet out of the then corresponding die.

[Printed, 10*d*. Drawing. See Repertory of Arts, vol. 17 (*enlarged series*), p. 268; Mechanics' Magazine, vol. 54, p. 218; Engineers' and Architects' Journal, vol. 14, p. 167; Patent Journal, vol. 11, p. 157.]

A.D. 1851, March 15.—Nº 13,557.

BROOMAN, Richard Archibald.—(*A communication.*)—This invention relates to a machine adapted to the manufacture of screws, the threads of which, by means of two adjustable grooved die plates of steel, are, whilst the die plates close in contact with the screws, rod, or blank, made by compression to any pitch upon rods of various sizes. The die plates which operate by the pressure of their grooved surfaces simultaneously against the upper and under sides of the rod, are so set in relation to each other and the rod between them, that as the rod revolves it receives spiral indentations, which take the form of the thread of a screw, the angle to which the die plates are set depending upon the diameter of the rod and the pitch and number of screw threads. The form of the dies may be modified by making them in the form of grooved rollers or segments of rollers, and instead of reciprocating they may have rotary motion.

A triple hand stock and dies constructed on the same principle is described.

[Printed, 1*s*. Drawings. See Mechanics' Magazine, vol. 55, p. 241; Patent Journal, vol. 12, p. 1.]

A.D. 1851, June 3.—Nº 13,654.

JACQUIN, Cornelius Alfred.—"Improvements in the ma-" nufacture of nails, pins, tacks, screws, and other similar" articles."

[No Specification enrolled.]

A.D. 1851, October 16.—N° 13,773.

ONIONS, WILLIAM.—This invention relates to the manufacture of cast-iron nuts, and a variety of other articles, from a compound of metal, consisting of 94 parts of Cumberland ore and 4 parts of steel, the compounded metal to be used direct from the blast furnace, without being first melted and cast into bars or ingots, and cooled. After being cast, the nuts and other articles are subjected to the process of annealing in the presence of oxide of iron ore, or oxide of iron. The castings are taken in sand moulds preferably from iron patterns or models, the tapping holes through nuts being formed by means of cores. The articles, placed in pots or boxes along with the powdered ore, are raised to a red heat, and are annealed for 120 hours if an inch in thickness, and if more or less, the time is regulated accordingly. After the nuts have been annealed, the exterior surfaces are dressed, and the interior thread or screw is cut in each in the ordinary manner, as when making like nuts of wrought iron.

The word "bolts" occurs in the title of these Letters Patent, but is disclaimed with other parts of the title by a Disclaimer filed April 16, 1852.

[Printed, 4*d.* No Drawings. Disclaimer printed, 4*d.* No Drawings. See Repertory of Arts, vol. 19 (*enlarged series*), p. 374; and p. 377 for disclaimer; and vol. 20 (*enlarged series*), p. 120; and p. 123 for disclaimer; Mechanics' Magazine, vol. 56, p. 335; Engineers' and Architects' Journal, vol. 15, p. 145.]

A.D. 1852, January 24.—N° 13,915.

HINKS, JOHN, and NICOLLE, EUGENE.—An invention of machinery for making nails, rivets, or pins, and screw-blanks. The metal rod from which the nails are formed is fed into the machine by a pair of bowls, and, passing through a tube, is directed between the respective curved periphery of two segmental dies, which squeeze or mould successive portions of the rod, corresponding to the length of the nail or articles in process, into a tapering or pointed form; this effect is produced on the rod by the convergent action of the parts which severally carry the axes of the segmental dies. Passing on in the form of a string of partially formed nails with heads and points united, the rod reaches a table where the nail pieces are separated by cutting tools, which are operated by a right and left-handed screw. Thence in succession they pass on and come under the operation of the heading punch, being severally held between nipping dies during the latter process. The rods are fed into the machine in either a heated or cold state.

[Printed, 10*d.* Drawing. See Mechanics' Magazine, vol. 57, p. 114.]

A.D. 1852, April 22.—N° 14,084.

NEWTON, ALFRED VINCENT.—(*A communication.*)—This invention, which relates to a series of machines adapted to the manufacture of wood screws, is also applicable to arranging and feeding pins and similar articles, and to assorting screws, pins, and articles of different sizes. It consists—

1st. Of a machine in which shaving the heads of screw blanks is performed at two distinct operations, partly by a roughing cut at a more obtuse angle than usual before the nick is cut, and partly afterwards by a cutter, which by this mode of operating finishes off the head of the screw without a burr or any straining of the metal, thereby avoiding the liability to break off at the angles formed by the nick.

2nd. The nicking of the screw heads is performed in a nicking machine by a circular saw. The screw blanks are held by the shank in a pair of grippers, between which and the cam or lever, which gives the gripping motion, is interposed a spring, whereby the machine is made self-adjusting to admit blanks of various sizes, and additional motion is given to the jaws after the blank is seized, whereby they are partly re-opened to allow the blanks to gravitate into the proper position they are required to take whilst being acted upon by the saw.

3rd. Relates to the making of pointed wood screws, the blanks for which are pointed before the threads are cut, in order to avoid the necessity for making heavy cuts by the chasing tools at the point, and thereby prevent the risk of strain or breakage. The pointing is therefore preparatory to the threading operation; it is performed in a separate machine by a suitably formed cutter that, by the action of a cam, is made to approach the end of the screw blank, which is held in a pair of jaws mounted on the end of a revolving mandril.

4th. The threading machine, in which the screw blanks are held by gripping jaws mounted on the end of a mandril; the jaws are operated by a rod toggle jointed thereto, and latched or unlatched by a sliding collar acting on the bevelled stem of the rod, and holding it so as to avoid longitudinal strain or pressure on the mandril. The mould which governs the line of motion of the cutter or chaser is so connected that it has freedom to vibrate in the sliding frame, and is thereby able to adapt itself to the vibratory motions of the chaser stock, the mould frame being moved to or from the screw blank by means of vibrating cams, the chaser each succeeding cut approaching nearer to the axis of the blank. The pitch of the screw is regulated by a leader.

5th. Also relates to machinery for threading screws, and has reference to a method, by means of two cams, of operating the fingers which present the blanks to the gripping jaws on the end of the mandril, the first cam being simply employed to hold up the fingers during the threading motion, and the second to operate them. In this machine two cutters or chasers are employed, one to form the thread on the cylindrical part of the shank, and the other the thread simultaneously upon the point.

6th. Machine for arranging and feeding screw blanks and other articles to machines employed in the several operations of shaving, nicking, pointing, and threading wood screws, or otherwise. The blanks or articles are taken from hoppers by means of bent fingers, which transfer them to inclined ways, to which a lateral motion is given.

7th. Consists of a machine for assorting screws or other articles according to their diameter and length, and delivering each size separately. The screws or articles pass from a hopper on to fixed inclined ways, the edges of which support them by the shoulder under the head, the shanks hanging between the side rails of the ways, down which they gravitate to the delivery end of the ways, which communicates with a series of shifting ways. " When any one screw reaches the lower end of the permanent " ways, it is first arrested by a moveable stop combined with the " ways, and before it is delivered by the withdrawal of this stop, " it is separated from the others by a second stop combined with " the ways and the first stop, and for the purpose of presenting " that one of the series of shifting ways which is to receive the " screw to be delivered, there is combined with the shifting ways " a detector, which is brought against the shank of the blank, " the diameter of which determines the extent of its motion or " its position."

[Printed, 4s. 8d. Drawings. See Mechanics' Magazine, vol. 57, p. 374.]

A.D. 1852, July 6.—N° 14,213.

RAMSDEN, John.—This is an invention of a tool or apparatus to be worked by either hand or power for the purpose of cutting the threads of screws. This operation is effected by the use of four cutters, which act upon the screw blank simultaneously. These cutters are disposed radially at right angles in a circular frame, all pointing to a common centre; the shank or end of each cutter-holder is hollow, and screw-threaded to receive a screw; each of these screws carries a bevel-toothed pinion severally engaging with the teeth of a bevel wheel concentrically mounted at the back of the frame. By these means, on moving the wheel in one or other direction, a corresponding convergent or divergent movement is imparted to the cutters.

[Printed, 6*d*. Drawing. See Mechanics' Magazine, vol. 58, p. 57; Practical Mechanics' Journal, vol. 5, p. 283.]

A.D. 1852, September 18.—Nº 14,298.

WARREN, James, and WALKER, Bernard Peard.—This invention relates to the casting and finishing of metal screws, to screw keys, and also to the construction of floors and bridges. The apparatus employed for preparing the sand moulds in which the screws are cast, is the subject matter of a prior patent granted to James Warren (No. 9042, A.D. 1841), and so far as regards screws the present invention is a modification of the former, and consists in the use of guide screws of a finer pitch than the screw patterns from which the screws are cast, the difference being compensated by causing the screwed guide plate, (which was formerly kept at a stated distance) to approach the bottom plate, and this is accomplished by the use of four regulating screws actuated simultaneously with the guide screws by any appropriate means. The heads of the screws are as heretofore moulded by means of a head plate with splays. The nicks are formed by pieces of steel projecting from holes plugged with fire-clay in a plate, which answers for a top moulding box. The countersinks and shanks of the screws are smoothed by dies in a screw press, and the heads are ground and brightened whilst held between two rollers, which revolve in opposite directions. These processes and appliances are only claimed so far as regards their application to the manufacture of cast screws.

"The peculiarity in the improved screw key or wrench is the " arrangement by which its strength to resist the expansion of " the jaws when turning round a screw or nut is rendered inde- " pendent of the accuracy of the fitting of the sliding jaw upon " the other or stationary jaw."

Floors and bridges are constructed with metal or other plates, so bent and connected with tie rods as to dispense with the use of girders.

[Printed, 10*d.* Drawings. See Mechanics' Magazine, vol. 58, p. 276; Engineers' and Architects' Journal, vol. 16, p. 186.]

PATENT LAW AMENDMENT ACT, 1852.

1852.

A.D. 1852, October 1.—N° 52.

McLELLAN, WALTER.—This invention relates to machinery arranged for the manufacture of rivets, bolts, spikes, nails, and screw blanks, and other articles of wrought iron or other metal. In making rivets, the end of a rod in a heated state is passed into the machine through a suitable guide up to an adjustable stop piece, which determines the length of the rivet, and by means of a cam and two cutters, one in motion and the other stationary, the rivet piece is severed from the rod and is taken down by a holder and placed in position exactly opposite the heading mould. A shaping slide actuated by an eccentric at this moment comes forward and presses an intermediate piece or die on the tail end of the blank, whereby the latter is forced into the heading mould and the head is thereby formed. The returning slide takes back the die piece and rivet, which is forced out of the die piece by a mandril that is concealed in a recess formed in the slide, and comes into contact with a fixed part of the machine. The shaping slide has a constant reciprocating movement, but the other operating parts are actuated intermittently.

[Printed, 8*d.* Drawing.]

A.D. 1852, October 1.—N° 146.

BRUNDAGE, EDWIN LEWIS.—(*A communication.*)—This invention relates to "machinery for forging nails, brads, and screw-

"blanks." The machine first described consists of a central anvil around which, circumposed radially in a horizontal revolving gripper frame, is set a series of grippers which severally receive in succession pieces of metal as they are successively cut by a pair of cutters from off the end of a nail rod. The stem of each pair of grippers carries a tooth wheel, and these wheels as the revolving frame by means of a worm and worm rack on its periphery moves round the anvil, engage with a fixed annular rack, whereby in addition to the circumvolution of the gripper frame, each pair of grippers receives an independent axial movement, in order that, as the nail pieces respectively held by them are carried over a single or double series of dies or swages set at varying radial distances on the central anvil, they may alter their position, and thereby receive the blows of the hammer which carries on its face the corresponding halves of the swages, on different parts of their surface, and thus be brought to the required size and form.

A modification is described, in which a second or bottom hammer, carrying on its face the series of swages or dies, is substituted for the central anvil.

[Printed, 1*s*. Drawings.]

A.D. 1852, October 5.—N° 231.

NICHOLSON, George Walker.—This "invention relates, "firstly, to an improved method of rendering screw-bolts, nuts, "and washers self-adjusting, so that though the object grasped "between the head of the bolt and the surface of the nut be not "of uniform thickness, the strain on the bolt shall be equally "distributed over the whole area thereof, . . . by making "the surface of the nut and the under side of the head of the "bolt convex, and by making the washers . . . under the "nut and under the head of the bolt, concave, to correspond "with the convexity of the nut and of the bolt head.

"Secondly, to an improved method of rendering a nut-mandril, "that is, a mandril on which nuts are turned, self-adjusting, so "that though the surface of the nut be not true, that is, not at "right angles with the axis of the nut, the strain on the nut-"mandril shall be equally distributed over the whole area "thereof, ... by forming a convex collar on the nut-"mandril, and by using a concave washer to correspond there-"with, so that if the nut be badly or imperfectly forged, the "washer will adjust itself to the inequality, and prevent the

" tendency to strain the mandril and injure the thread; and, " thirdly, to an improved method of turning a convex nut, . . . " by using a concavo-concave washer along with the self-" adjusting nut-mandril."

[Printed, 8*d*. Drawings.]

A.D. 1852, October 16.—N° 414.

WOODS, John.—(*Provisional protection only.*)—This invention relates " to such screw-stocks as are used for cutting screws by " hand, the points of novelty consisting in the method of mounting and arranging the dies, and in forcing the cutting die " forward. Within the screw-stock are formed two recesses, in " which the dies are placed; one of these is elongated, and " within the elongated part is placed a nut capable of being " turned upon a screw, also placed in the recess; one portion " of the nut turns in a slot, which prevents it from moving forward, so that upon turning the same the screw is compelled to " advance and carry forward the die so as to operate upon the " metal to be cut. Upon the top of the stock is placed a plate, " which being kept down by screws retains the dies in their " seats. This plate, however, may be removed by slipping it " upon the said screws by means of slots, in order to remove the " dies and replace them by others suitable for cutting another " description of screw."

[Printed, 4*d*. No Drawings.]

A.D. 1852, October 23.—N° 494.

BERRY, Philip.—This is an invention of machinery or apparatus for making bolts and nuts, and similar articles. The bolts are forged by a machine which mounts a pair of rollers, to which a mutual reciprocating backward and forward movement is imparted by means of a lever on the axle of one roller, the two rollers being geared together. On the surface of each roller there is a series of four recesses, which as the rollers work together form four separate pairs of dies that in succession operate upon the end of the rod. The first pair squeeze or roll a portion of the end of the heated square bar, sufficient to form the shank of the bolt, into a lozenge form, the second pair leave it square but reduced in size, the third pair make it oval, and the fourth pair finish the bolt to the form and size required, excepting the head, which is formed when the bolt is cut off, by leaving attached to the bolt shank a sufficient portion of the original square bar.

The blank nuts are cut from the heated bar by a machine which compresses them between dies, and punches the tapping hole.

[Printed, 1*s*. Drawings.]

A.D. 1852, October 25.—Nº 518.

JOHNSON, William.—(*A communication.*)—(*Provisional protection only.*)—"This invention relates to the manufacture of " spikes and other metal pins or connecting pieces from metal " rods, the articles being finished in one machine, with one end " pointed or sharpened, and the other formed into a head by " turning or bending over a piece of the whole thickness of the " rod. The rod of metal, properly heated, is introduced between " a pair of cutting and shaping rollers, each of which has four " hard steel cutting and shaping dies projecting from its periphery, " the pair of rollers being so geared together that the four " pairs of dies shall work in concert. The projecting portions of " these dies are triangular, or nearly so, in section, and the " rollers in which they are set have an intermittent rotatory " motion, and as the rod is passed in between them it is drawn " forward so as to pass its front end intended for the spike head " into a horizontal channel in a 'heading' plate, by which time a " pair of the dies will have come into contact, severing the required " length of the rod. This severance also sharpens the " end of the piece cut off, and an additional inclined lip on the " upper die at the same time forms a slope or incline on the end " of the rod whence the piece has just been cut. In this position " the rollers are stopped, and a crank action comes into operation " to traverse a heading piece downwards, and against the head " end of the severed portion, and bend the end at right angles to " one side over the edge of the heading plate to form a hook " head. This completes the rivet, and the rollers make another " portion of a turn for the repetition of the process."

[Printed, 4*d*. No Drawings.]

A.D. 1852, October 26.—Nº 524.

ROWLEY, Charles.—This invention relates to ornamenting the heads of nails, and applying ornamental heads to nail shanks.

1st. Forming nails with glass heads, which may be cut in imitation of precious stones; the shank may be a common tin tack, or it may be made out of wire, and bent or otherwise. The head of the tin tack is enlarged by soldering underneath it a small tin disc, through a hole in which the shank is past; the head and disc are then flattened or planished down level to receive the glass top, which, having been prepared or quickened, may be attached by common solder, which will fuse at a low temperature. The glass heads may in some cases be formed by pressing the material into moulds, and holes may be made to receive the shanks when they are made of bent wire, and soldered in.

2nd. Relates to a variety of substances and material applicable for forming the heads of ornamental nails. These consist of "stone, porcelain, ivory, bone, pearl, tortoise-shell, leather, wood, "gutta-percha, vegetable ivory," and similar substances cut or moulded to the required shape, and attached to the shanks by soldering or otherwise, according to the nature of the substance, fancy or precious stones being set within the raised or flanged edge of a disc or other shaped piece of metal, fixed or soldered to the head of the tack or nail, and to heads of gutta percha or other plastic material; the shanks of bent wire are inserted during the moulding process.

3rd. Ornamenting nails having heads of metal, by clipping the edges, piercing, and shaping in various ways.

4th. Enamelling the heads of nails.

5th. Inserting coloured substances into the hollow heads of nails. These heads form a kind of shell so cut and pierced as to form various devices, through which the coloured substance is seen.

[Printed, 6*d.* Drawings.]

A.D. 1852, November 29.—N° 908.

ELLINGTON, Francis William.—This invention relates to making screws for collapsible and other vessels, with dies and forcers made in two parts to facilitate the removal of the screws, instead of using, as heretofore, dies and forcers which are solid. The drawing exhibits amongst other things a collapsible vessel previous to its having a screw made outside the neck, and another such vessel after the screw has been produced. The dies may be made in more than two parts; they are received in a cylinder, coming into position together at the bottom, and there act as one solid die. The screw is made by the descent of the forcer, which when rising brings up the dies and the vessel, the dies separating as they rise, and gradually get clear of the screw-thread, thereby rendering the process of unscrewing the neck of the vessel from the dies unnecessary.

Describes the manner of constructing and using forcers, combining several expansible parts, for the purpose of producing internal screws.

[Printed, 8*d*. Drawing.]

A.D. 1852, December 11.—N° 1023.

ROTHERA, WILLIAM.—(*Provisional protection only*.)—This invention, relating to the manufacture of nails, screw-blanks, sprigs, brads, and similar articles, consists in the use of a pair of rollers, caused by means of corresponding tooth-wheels, mutually to revolve at a uniform speed. These rollers act as revolving dies and cutters, the form of one half the sprig or nail, or article longitudinally divided, being "countersunk "in the periphery of each roller cornerwise, that is to say, the "indentation in each roller is triangular. The said indentations "are parallel to the axes of the rollers, and are arranged close "together, alternately head and point, so that the metal that re-"mains between them acts as a punch or cutter, dividing the "sprigs, whilst the indentations act as a die and form them. "The sprigs or brads are formed from a strip of plate metal, "the width of which is the length of the intended nail. In "manufacturing headed nails of various kinds, the indentations "in the rollers are formed cornerwise, and are arranged alter-"nately head and point being at right angles to the axes of the "rollers; the sides of the countersink or indentation being "brought to a cutting edge as in the former case. These nails "are formed from rod metal. For screw blanks the rollers are "formed in a similar way, except that, of course, the indenta-"tions are semi-circular; and for any other similar articles the "form and arrangement of the indentations must be suitably "varied, provided always that the side of the countersink is "brought to a cutting edge, so as to act as a punch for cutting, "and a die for forming the articles at the same time."

[Printed, 4*d*. No Drawings.]

1853.

A.D. 1853, January 12.—N° 82.

ARROWSMITH, John.—This invention, relating to machinery designed for shaping metals, and adapted to the manufacture of rivets, screw blanks, plain bolts, and to other purposes, is performed by placing the metal pieces of rod or bar iron, which are first cut to the required length, between two slightly inclining surfaces, to which continuous or reciprocating motion is imparted in opposite directions, so that the pieces of metal, which are inserted between them at the end where they are widest apart, gradually roll between them to the opposite end where the surfaces are closer together, and during the passage of the metal pieces between the surfaces, they are gradually squeezed and reduced in diameter, made tapering, or shaped to the desired form, the surfaces being relatively set and grooved, shaped, or indented, so as, when required, to form enlargements on the pieces of metal, such as the heads of rivets, bolts, or screw blanks.

Describes three different arrangements of machines, each acting with inclining surfaces moving in opposite directions. In the first machine the inclining surfaces are attached to the contiguous faces of two discs relatively parallel, and revolving in opposite directions on the same axial line. In the second machine the inclining surfaces are segmentally curved, and attached respectively to the inner and outer surfaces of two drums, revolving in opposite directions, one concentrically within the other. The third machine acts by means of two inclining reciprocating surfaces, to which motion is conveyed by connecting rods from a double throw crank.

[Printed, 10*d*. Drawings.]

A.D. 1853, February 4.—N° 308.

GRIFFITHS, Robert. — (*Provisional protection only.*)—This invention, relating to the manufacture of bolts and rivets, as described by the inventor, consists "in first having the iron "rolled in the ordinary way for making rivets, &c., but the size "of such round bars to be as large in diameter, or larger, as the "head of the rivets or bolts are required ; it is then heated and "cut into lengths required for the rivets, and drops from the

" shears between two rolls and a fixed excentric ring, which rolls " revolve and also travel all round the entire ring, at the same " time form the piece of iron into the shape required for rivets, " &c. I also, when required, roll the bars with projections on " them, and then cut and finish the rivets and bolts by either " shaping them in the moveable rolls or presses for that pur- " pose."

[Printed, 4*d*. No Drawings.]

A.D. 1853, March 22.—N° 698.

McCORMICK, Samuel.—This invention relates to the manufacture of screw bolts, spikes, and rivets, and to the machinery employed, such machinery being applicable for forming screw-threads, mouldings, and ornaments on metal. The heated rod out of which these articles are to be formed, is introduced into the machine and advanced at intervals a proper regulated distance by a pair of feeding fingers to be grasped by a pair of dies, whereby it is held whilst, by means of a cam, a cutter on the end of a lever is brought down and cuts off a piece the required length for a bolt or screw. This piece is held between the dies during the heading process, which is performed by means of a suitable punch acting on the heading dies, the punch being projected by a slide, which obtains motion from an eccentric, whilst a strong crosshead forms a resisting abutment. When making bolts for railways, or tapering bolts, and rivets for boilers, the heading dies must be changed for others of a suitable form. The bolt when made is discharged from the dies by a slide and rod, whilst the feeding fingers at the same time bring forward another length or portion of the heated rod.

The moulding or impressing a screw thread or ornament on a screw-blank or a plain shaft or shank, is effected by means of three revolving dies, which are trigonally disposed at suitable angles in a machine, so as to operate by pressing simultaneously on three sides of the blank or shaft which has a central position between them.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1853, March 28.—N° 733.

ASBURY, George Oakes. — This invention relates to a machine for making dowels with pointed ends.

A connecting rod actuated by an eccentric cam gives reciprocating motion to two dies, respectively fixed to a part of the machine which is caused to slide to and fro on the bed plate; these dies simultaneously approach two other dies which are fixed on the machine bed. The two pairs of dies are suitably formed for tapering and shaping the two ends of the dowel; the metal rod from which the dowels are made being introduced through a guide is gauged to length by an adjustable stop, the dies respectively being also capable of adjustment in order that dowels of different lengths may be made by the machine. After the pointing operation, each dowel in succession as it is made, remains united by one of its pointed ends to the rod, whence it is separated by a cutter whilst the dowel is still gripped by the dies.

[Printed, 6*d*. Drawing.]

A.D. 1853, April 5.—N° 819.

CARR, Thomas.—(*Provisional protection only.*)—This invention relates to the manufacture of "nails and other fastenings," and to the machinery or apparatus employed. The special part of the invention consists in forming nails with "plug or perpen- "dicular" heads. One form of such heads projects only on the two opposite sides of the nail, the other side being fair or lineable with the shank, so that the nails may be driven close together. The machine employed carries a bottom die or mould, which is capable of moving to and fro on a horizontal plane, and the other die is fitted to the hammer head, and kept up to a shoulder by the aid of a spring, the back of the die forming a kind of punch, slightly projecting from the back of the hammer. To give the shaping blow, the metal is struck on an anvil, the hammer afterwards being carried up by a spring, until the projecting piece or punch at the back comes in contact with a rigid stop piece, which causes the nail to fall out of the die.

This kind of machine answers for light work, but when the larger sizes of rivets and such like articles are required, it is preferable to employ a screw for forcing the dies.

[Printed, 4*d*. No Drawings.]

A.D. 1853, May 6.—N° 1116.

DANKS, John Ryan, and WALKER, Bernard Peard.—This invention relates to a machine adapted to the manufacture of ordinary cut nails, which machine (as described by the inventors), causes "the blank for the nail to turn over or become "reversed during the descent of such blank from the strip of "metal from which the nail is being made. This movement "we effect by means of the spring guage, which in our arrangement, is placed upon a swivel joint, and is made to descend "through a greater space than the cutter itself, thereby causing "the blank to perform a quarter of a revolution during its "descending traverse from the crude strip of metal to the grooved "dies employed in shaping the nail head. The result of this "operation is the production of a nail which has its opposite "sides shaped to the same angle of inclination, whilst the fibres "of the metal are kept in a sound and compact condition, instead "of being laid open or disintegrated, as usually occurs in the "ordinary process of manufacture."

[Printed, 6*d*. Drawing.]

A.D. 1853, June 15.—N° 1456.

ELLIOTT, John, and BROWN, John.—This invention relates to a machine, whereby wire rods are expeditiously cut in lengths and headed to form rivets, spikes, or screw-blanks. The rod is fed into the machine by a pair of grooved rollers, and each successive piece as it is cut off, falls down a conducting tube into one of an annular series of dies, which are fitted at equal distances apart in the periphery of a circular frame, the intermittent rotary movements of which so correspond with the action of the cutting off apparatus, that as each succeeding piece is cut off the rod, an empty die comes beneath the end of the tube in an exact position to receive it. Coincident with the rotative movements of the annular frame, the main shaft of the machine gives vertical reciprocating motion to a plunger which carries a heading die. This die operates in succession upon the ends of pieces of rod severally carried by the dies in the frame, and forms to each piece a suitable head, the frame being supported on a semi-circular anvil. By means of an eccentric, the headed rivets or articles are at one point, during the intervals between the rotative movements of the frame, pushed out of the dies in succession by a pin on the end of a sliding rod.

[Printed, 8*d*. Drawing].

A.D. 1853, June 17.—N° 1480.

HOGG, James junior.—This invention relates to the application and combination of glass, porcelain, stone ware, and other substances, plastic and otherwise, to and in the manufacture of a variety of fancy articles of household furniture, and divers other matters, which are severally enumerated and described under twelve separate heads, into which the subject matter of the invention is divided, including amongst other things "an ornamental "stud, knob, or circlet, to be used with nails for suspending "cords to hang pictures in rooms. This stud, knob, or circlet is "made either in one piece, or in several pieces joined or cemented together. Of whatever construction otherwise, it has "an aperture in the centre, that it may be free to slip on the nail "which has been driven into the wall. The head of this nail is "to be so formed that a little down from the top, which is struck "by the hammer in driving it home, there is a portion of greater "diameter, upon which portion there is a screw thread. This "part of the nail carrying the screw thread projects through the "aperture left in the ornamental stud, knob, or circlet, which "latter having been placed on it, there is then applied an ornamental cap, or piece of metal, having also an internal screw "thread. This ornamental cap being screwed on, the ornamental stud, knob, or circlet already described, is secured. A "modification of this method of making fast the ornamental "stud, knob, or circlet is, by affixing to it in the centre or at the "back (that is to say,) the side which is intended to be next the "wall, the piece of metal which has an internal screw thread "corresponding to the head of the nail. In this state the ornamental stud, knob, or circlet is at once made fast by being "screwed on to the head of the nail which has been driven into "the wall."

[Printed, 6*d*. No Drawings.]

A.D. 1853, July 29.—N° 1777. (* *)

NEWTON, WILLIAM EDWARD (*A communication*).—"Improvements in depositing metals or alloys of metals."

This invention relates to the solutions used for metallic deposition either by immersion or "by galvanic agency."

To electro-deposit brass the double salts of the metals (copper and zinc) and an alkaline base are used; the following are mentioned, the chloride, acetate, carbonate (with ammonium as a base), and tartrate (with acid "hydrochlorate of ammonia"); also a solution of the citrate of copper and of zinc in citric acid, or of the tartrate of these metals in potash or soda, may be used.

For depositing copper on iron by immersion or by the battery, a solution of acetate of copper in acid "hydrochlorate of ammonia," or of citrate of copper in citric acid, may be used.

For bronzing by galvanic agency, a solution of the double tartrates of the elementary metals (copper and tin) and potash may be used; for an alloy of zinc, tin, and copper, the double cyanide of copper and potassium in combination with zincate of potash and stannate of potash, or the double tartrate of the metals and potash, may be used.

The following solutions may be used for electro-brassing:—A salt of copper in cyanide of potassium in combination with a salt of zinc in ammonia, or the inverse combination.

For electro-bronzing, a solution of salt of copper in cyanide of potassium and of protochloride of tin in potash may be used.

Another part of the invention consists in electro-depositing an alloy of zinc and manganese from a solution containing chloride of sodium, sulphate of zinc, and chloride of manganese; or sulphate of manganese, with "sulphate or hydrochlorate of ammonia" or chloride of potassium, and chloride of zinc, may be used.

This invention also consists "in obtaining great thickness of "coating by depositing successive layers of metals or alloys." The following metals may be successfully applied:—Zinc, lead, tin, nickel, cobalt, copper, palladium, and "platina;" also the following alloys, copper and zinc, copper and tin zinc and manganese, and copper zinc and tin. The same result may be obtained by depositing alternately or successively from different solutions of the same metal or alloy. The above described processes may be applied to coating nails, &c.

[Printed, 4*d*. No Drawings.]

A.D. 1853, August 1.—N° 1796.

GRIFFITHS, Robert.—This invention relates to a machine adapted to the making of rivets and bolts from rods rolled to the size of the heads, the stems or shanks being drawn out by a rolling process. Upon a central vertical shaft is keyed a double disc or carriage, that mounts three pairs of small rollers, which are grooved and turned the required shape to form a rivet. Each of these pairs of rollers act independently of the other pairs, and they are so placed in vertical position, that a portion of each roller extends beyond the periphery of the carriage, so as to come within a short distance of a strong metal ring, by which it is circumvested. This ring in relation to the central shaft is eccentrically placed, and rigidly fixed to the machine frame, so that as the pairs of rollers are carried round by the disc, the distance or annular space between them and the inner periphery of the ring up to a certain point gradually diminishes. The pieces of heated rod, cut off in the machine to the required length, are entered separately in succession between the several pairs of rollers and the ring, at that point where the annular space is the widest, and whilst moving round to the opposite diametral point, are, as the annular space gradually diminishes in breadth, compressed and rolled to the required form.

[Printed, 6*d*. Drawing.]

A.D. 1853, October 13.—N° 2356.

ROBINSON, William.—This invention relates to a machine for forging iron or other metal into various forms or shapes, such as screw-bolts, nuts, rivets, pins, studs, and similar articles. In the upper part of the machine is mounted a series of hammer blocks which carry dies, and work up and down in vertical guides; these hammer blocks are operated at a rapid speed by a corresponding series of eccentrics formed on the main cross shaft, which is horizontally mounted at the top of the machine, and obtains motion by means of strap pulleys direct from the motive power. A series of bottom dies is fitted into a corresponding series of anvil blocks, which move up and down in the lower part of the machine in guides so rectilineally disposed that the dies in the two series respectively in the hammer and in the anvil blocks form a series of pairs of dies. The upper dies have a constant and rapid up-and-down movement, limited to the throw of the eccentrics, but the lower dies are gradually raised by revolving cams, and the metal for the forgings being introduced between, is quickly hammered or moulded and reduced to the required shape. A pair of shears is attached to the side of the machine for cutting the articles to the required length, and as soon as finished they are delivered from the machine by a lever, which is brought into contact with a cross bar.

[Printed, 10*d*. Drawing.]

A.D. 1853, November 11.—N° 2615. (* *)

PLATT, John.—(*Letters Patent void for want of final Specification.*)—" Certain improvements in apparatus or machines for

" forging, drawing, moulding, or forming spindles, rollers, bolts, " and various other articles in metal."

"This invention relates to improvements upon that principle " of apparatus or machine for the above-mentioned purposes " known as 'Ryder's forging machine."

It consists, firstly, in connecting the hammer with the excentric, "so that it will lift it as well as force it down," thereby dispensing with the springs generally used for lifting the hammer after the blow has been struck, and for keeping the "cradle" in contact with the excentric.

"Secondly, in the addition of mechanism by which the under " or bottom swage and block can be raised or lowered during " the operation of forging and while the machine is at work;" which can be accomplished by means of "an incline and wedge, " which may have motion imparted to it backwards and forwards " for this purpose by means of a screw, pinion, and wheel, the " wedge acting upon the end of the piston which acts against " the spring within the swage block."

"Thirdly, in an arrangement of mechanism for adjusting the " bottom or under swage and block." This is accomplished by an arrangement similar to that referred to as constituting the second part of this invention, "but as it is only employed for " adjustment no wheel and pinion are required, and the screw " need only act to force the incline forward so as to raise the " block and swage."

The inventor states that by these improvements the wear and tear of the machine are diminished, and the machine itself rendered capable "of being employed in a heavier class of work " than has been hitherto practicable."

[Printed, 4*d*. No Drawings.]

1854.

A.D. 1854, March 3.—N° 522.

BLOOMER, CALEB.—This invention relates to the making of iron spikes and bolts, the ends of which, being split, are, when driven into wood, caused to open by means of a wedge, whereby when driven they are prevented from rising, and are more capable of bearing external concussion without becoming loose, as is generally the case with ordinary bolts driven into railway sleepers, the loosening being the effect of the constant percussion and vibration to which they are exposed. This result is effected when the bolt is driven, the thin end of the wedge being previously inserted into the split end of the bolt. Every succeeding blow after the thick end of the wedge has reached the bottom of the hole causes the split end of the bolt to open laterally, forcing the two sides into the timber in which they hold like two fangs, whence they cannot be drawn by any ordinary concussion.

[Printed, 6*d*. Drawings.]

A.D. 1854, March 13.—N° 606. (* *)

HOPPER, GEORGE.—" Improvements in pins for railway chairs."

The invention relates " to the manufacture of wrought-iron pins " or spikes as at present used for fixing and holding down the " chairs used on railways; the particular form or class of pin or " spike" referred to " is that wherein the body of the pin is " spirally twisted, so as to give it a better hold in the sleeper." " Such pins or spikes as hitherto made .... are manufactured out " of square bar iron, and the shank or body of the pin or spike " is left square at its head or neck portion beneath the head." Now according to this invention the neck portion is formed round or cylindrical in transverse section instead of square or rectangular. " Pins or spikes made in this way fit accurately all " round in the holes of the chairs; they allow no jarring wear to " take place, and the chairs, and consequently the rails, are held " with much more firmness than hitherto."

[Printed, 6*d*. Drawing.]

A.D. 1854, April 5.—N° 782.

HOWDEN, JAMES.—This is an invention of a machine arranged to make rivets, bolts, spikes, screw-blanks, and similar articles out of heated rods of wrought iron or other metal. The end of the heated rod every successive action of the operating parts of the machine, is fed or advanced through a guide socket up to an adjustable stop, in time to be operated upon by a cutter, which rises and cuts off the regulated length, and carries the piece up to a position opposite the lowest die of an annular series circumposed at equal distances in the face of an intermittently revolving disc, which is locked during its stationary intervals by a stop rod.

The head moulding die is then brought forward, and by squeezing the rivet piece well into the disc die, it gives to the rivet the required form. As soon as the heading die retires and the disc is relieved from its working pressure, the latter moves round one division, thereby bringing the next die of the series in the disc into position opposite the cutter ready to receive the next piece from the rod, which has been cut off in the interval.

[Printed, 1*s*. Drawing.]

A.D. 1854, April 15.—N° 872.

CROISY, Joseph.—This invention relates to a machine for making bolts, rivets, screw-blanks, railway pins, and similar articles, which are made from rod-iron heated to a proper degree by ordinary means. The rod is so introduced through a guiding tube into a tubular holder, longitudinally slit to form jaws or clamps, that a small portion of the end of the rod projects beyond, just sufficient in bulk to form the head, the rod being firmly held between the jaws by external pressure. By means of a lever, so soon as the rod is fixed in position, a cutter descends and takes off a bolt-length, remaining between the end of the piece cut off and the end of the rod, whilst a squeezing hammer, by means of a lever actuated by an eccentric fixed on the driving shaft, is forced against the opposite end of the bolt-piece, which is projecting beyond the holding jaws. By this means the head is formed, and by a movement of the holder, the bolt, by means of a picker, is forced from between the jaws, which then resume their first position and again close upon the end of the rod.

[Printed, 8*d*. Drawing.]

A.D. 1854, May 5.—N° 1008.

BARBETTE, Antoine Marie Philibert.—(*Provisional protection only.*)—This invention relates to the manufacture or casting of brass heads on to iron wire stems, or shanks having small heads; it is described by the inventor as follows:—

" My invention consists in sinking small headed iron wire " points into sand moulds prepared for casting suitable disks, " regularly disposed in straight lines on both sides of a casting " groove in the sand. The upper part of the mould being set " fast on the under part, & the small headed wire points sunk at " their respective places, the molten metal is allowed to flow in

" all the prepared spaces; when cold the nails adhere to the cast " groove, whence they are broken off and separately stamped " under any suitable machine, to give them the required shape, " and afterwards gilded or silvered, polished or burnished."

[Printed, 4*d*. No Drawings.]

A.D. 1854, May 12.—N° 1055. (* *)

PLATT, John.—" Certain improvements in apparatus or machines " for forging, drawing, moulding, or forming spindles, rollers, " bolts, and various other articles in metal."

This invention relates to the apparatus known as Ryder's forging machine, and the first improvement "consists in an " arrangement whereby the springs (either internal or external) " hitherto used for lifting the hammers after the blow has been " given, and for keeping the cradle pieces in contact with the " excentrics, are dispensed with, which is accomplished by con" necting the hammer with the excentric, so that it will lift it as " well as force it down."

The second improvement consists in the addition of mechanism by which the bottom or under swage or block can be raised or lowered during the operation of forging, "which movement is " found necessary in forging a certain class of articles." This mechanism consists of "an incline and wedge," which wedge " may have motion imparted to it backwards and forward by a " screw, pinion, and wheel, or other mechanical contrivance." The incline is fixed on the bottom cross bar of the machine, or cast with it, and the wedge rests upon the incline and supports the swage block, which, by moving the wedge to and fro, is thus raised and lowered at will.

The third improvement " consists in certain mechanical arrange" ments by which the lower swage can be regulated so as to forge " taper as well as parallel work during the operation of forging," and this "is accomplished by so arranging the swage that it can " be moved from perpendicular to oblique positions, so as to suit " the work required." The " socket box," into which the swage block fits, is provided with two centres or axes resting with their pivots in a sliding frame. The bottom part of the socket box forms a segment of a circle, the curve of which is struck from the centres or axes, and the sliding frame is formed of three pieces, viz., two sides and a bottom, which are screwed together by bolts, and it fits into vertical grooves formed in the side framing of the machine; being moved vertically, so as to suit the thickness of the work, by means of an incline or wedge and a screw.

The fourth improvement consists in an arrangement of mechanism for adjusting the lower swage and block, "which has " been hitherto accomplished by screws and check nuts, which, " having to sustain the shock of the hammer, are very liable to " get out of repair. It is accomplished by an arrangement " similar to that referred to in the first portion of the second part " of this invention, but as it is only employed for adjusting, no " wheel and pinion or other mechanism are required, as the " screw need only act to force the wedge forward to raise the " swage block."

[Printed, 10*d*. Drawing.]

A.D. 1854, June 9.—N° 1273.

BROOMAN, Richard Archibald.—(*A communication.*)—This invention relates to the manufacture of cut brads and lath and other similar nails, which are cut from a narrow sheet of metal, in width corresponding to the length required of the nails or brads.

There are two cutters or shears which move and act in conjunction with one bottom cutter or shear. The two moving cutters are mounted to project at the opposite sides from the periphery of a fly wheel, and the bottom cutter is fitted to a horizontal lever which has its fulcrum on, and is supported by an anvil block, and is caused to vibrate by two eccentrics on the fly wheel shaft, respectively connected one to each end. The narrow rod or sheet is, by means of a feeding apparatus actuated by a worm and worm wheel, presented through guides directly over the bottom cutter, moving forward at a speed relatively corresponding with the revolutions of the fly wheel. The two moving cutters or shears on the wheel are respectively set to angles corresponding with the changing angle of the bottom cutter or shear, and they by turns cut pieces from the narrow bar, such pieces alternately tapering from the opposite sides.

[Printed, 8*d*. Drawings.]

A.D. 1854, June 22.—N° 1372.

BELLFORD, Auguste Edouard Loradoux.—(*A communication.*)—This is an invention of machinery designed for forging or hammering iron, and applicable to other materials. The machine acts by means of two side hammers, which strike simultaneously on the piece of metal under operation, and alternate with the blows of one top hammer, which strikes conjointly with the rising of an anvil that, at each successive movement, comes up in time to support the metal piece and resist the blows of the top hammer, which, as also the blows of the side hammers, are, by the peculiar arrangement of the operating mechanism that is attached to the hammer shanks, made somewhat elastic. The faces of either, or of all the hammers may be furnished with swages or dies, thereby rendering the machine capable of making various kinds of nails, spikes, etc. In some cases the top hammer may be dispensed with, and the side hammers used alone, or the action of the side hammers may be suspended whilst the top hammer is used in conjunction with the anvil, " the " peculiar swinging elastic blow which the hammers give . . . " rendering the upper hammer, when used alone, much prefer- " able to the ordinary trip hammer."

[Printed, 10*d*. Drawing.]

A.D. 1854, June 23.—N° 1382.

FONTAINEMOREAU, Peter Armand le Comte de.—(*A communication.*)—(*Provisional protection only.*)—This invention relates to the manufacture of nails by a machine mounting two cylindrical revolving dies. Around one cylinder is an annular groove, which has at regular intervals a varying depth, and also a series of enlargements corresponding to the tapering form of the heads of nails. The other cylinder carries an annular projecting ridge with a corresponding series of enlargements. The two cylinders or dies, revolving at a uniform speed, act in concert upon the nail rod, which, whilst passing between them in the annular groove, is compressed or moulded into a continuous string of nails.

[Printed, 6*d*. Drawing.]

A.D. 1854, July 6.—N° 1480.

GLASGOW, John.—This invention of machinery for " cutting, " compressing, punching, shearing, and shaping metals," refers to three machines, consisting of,—

1st. A duplex machine for making rivets, spikes, bolts, and similar articles, the fly wheel, shaft, and gearing, being disposed at the top of the machine out of the way of the workman, thus making the working of the machine more safe, and less liable to accidents. This machine operates by means of a double set of apparatus at each end, where the metal rods are fed and cut off in regulated lengths alternately by the ends of the reciprocating slides, which carry the cut-off pieces into positions by turns opposite heading punches mounted in the ends of reciprocating slide frames, each end of the slides acting laterally as moving dies, by compressing the shanks of the rivets or bolts; after the heading operation the finished articles are forced out by an ejecting pin.

2nd. Duplex machine for punching, shearing, and cutting metals, having the same arrangement with regard to the fly wheel, shaft, and gearing, which are disposed at the top across the machine, on each side of which there is a pair of shears, the lower shear of each pair being screwed to the frame, and the upper shears attached to vertical slides, operated alternately by levers which obtain motion from eccentric cams.

3rd. A duplex cutting and punching machine, designed for making from bars of iron, nut-blanks for screw bolts, and other similar articles. This machine has also the driving shaft and fly wheel at the top. It has two sets of operating apparatus worked by one eccentric shaft, which passes through the machine. Each set consists of a cutting-off die and punching ram fitted to the lower end of a vertical slide, and a pair of finishing dies, which are operated by another slide. The heated rod is presented to the cutting-off die, which descends and takes off a piece the required size for a nut, the central hole being punched at the same time; the nut piece is then removed to the finishing dies, which compress it to the desired form.

[Printed, 3*s.* 2*d.* Drawings.]

A.D. 1854, July 21.—N° 1611. (* *)

HARRATT, CHARLES.—" Improvements in fastenings for ship " building." This invention has for its object " improved fasten- " ings to be used in place of trenails and fastenings now employed " in ship building, and the improvements consist of making each " fastening of three or more parts, in such manner that the parts " of a fastening being introduced into the hole drilled, cut, or " formed to receive it, are expanded by the introduction of an " internal key or instrument; by this means it is not necessary

" that the fastening should pass through both timbers or planking " which it is intended to hold together, and it is preferred that " a fastening should not pass through and through, on the con- " trary, that it should only pass through one of the timbers or " planks and partly into the other. For this purpose, each of the " outer parts of a fastening is made with a projection or flanch " at each end, of such a form that it will pass through or into " the hole cut to receive a fastening, and so that when expanded " the fastening may by the flanches hold the two pieces of timber " or planking together, and prevent their being separated so long " as the fastening is in an expanded state."

[Printed, 6*d*. Drawing.]

A.D. 1854, August 5.—N° 1718.

STANSBURY, Charles Frederick.—(*A communication from Thomas H. Barlow.*)—This invention of machinery employed in the manufacture of cut nails, relates to a peculiar mode of shearing the blank from the nail plate, to so arranging the shears or grippers that they are operated by one rock shaft, and to the mode of feeding up the nail plate.

The moving cutters are carried by vibrating stocks connected to the rock-shaft, and the fixed cutters are mounted on stationary stocks respectively at such angles as suit the working angles of the moving cutters and vibrating stocks. That portion of the stocks immediately beneath the cutters form gripping jaws, seizing the blanks as they are cut in rotation from the nail plate, and holding them during the operation of the "headers."

The feeding up the nail plate is effected by means of a plate holder and a sliding escapement, which also gauges the feed of the plate holder.

[Printed, 6*d*. Drawing.]

A.D. 1854, September 19.—N° 2022.

PORTER, Joseph.—This invention relates to machinery for cutting, punching, forging, and forming nuts, bolts, screws, and various other articles in metal. With regard to nuts, the end of a bar of heated metal of suitable size is placed between dies, which approach each other, and cut off sufficient to form a nut, and at the same time shape the nut by compression on the sides; the nut is then forced into a die beneath it by a descending ram, which shapes it top and bottom, and a punch, which works through the ram, makes the central hole. The bottom of the die then slides aside, and the ram makes a further descent so as to force the nut through the die, after which the ram is raised, the bottom of the die replaced, and the operation repeated, forming the next nut in the same manner, and so on. The dies are modified to form six-sided nuts, and square nuts may be cut off by a suitably shaped punch.

The mechanism is modified for making bolts, which are cut from the bar the required length, the die and ram act without the central punch, and a pair of lateral dies finish the operation, the machinery combining longitudinal and lateral compression.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1854, October 5.—N° 2146.

LANDER, John Adams.—(*Provisional protection only.*)—This invention relates to the cutting shears or apparatus employed in the manufacture of spikes and nails. Instead of making the cutting blades respectively as heretofore, of one piece of chilled metal, according to this invention they are to be made in two parts, one part or cutting edge of each blade to be made of cast steel hardened and tempered, united by adjusting screws to the back or other part of the blade, which is to be made of cast iron. By this means the cutting blades when worn may be renewed, or removed, sharpened, and re-fixed, as the case may be.

The cutting surfaces of the roller shears employed for cutting plates into nail strips, are to be separated from the rolling surfaces which give to the nail the tapering form, also the rollers are made to work in a steel box with two sides only removable, instead of forming the box of cast iron with all movable sides. The steel box is more durable, and the tendency to form fins or burrs on the edges of the nail during the rolling process is diminished.

[Printed, 4*d*. No Drawings.]

A.D. 1854, December 11.—N° 2600.

JAMES, William.—(*Provisional protection only.*)—The object of this invention, which relates to the manufacture of spikes, bolts, screws, pins, and similar articles, is to cause them to hold better when driven into wood, by making one or more projecting threads or feathers on the sides during the rolling process, whilst manufacturing the iron bars from which such articles are to be made; and during the process of forging, by twisting the bolt or spike or article, give to the threads or feathers a spiral form, to a certain extent resembling a screw. When square bolts and articles are required, the threads or feathers are not necessary, as the angular corners of the bar when twisted answer the same purpose.

[Printed, 4*d*. No Drawings.]

1855.

A.D. 1855, January 31.—N° 242.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—(*A communication from Charles H. Wateron.*)—This invention relates to machinery for forging nuts and washers, which are respectively cut from a heated or cold bar of metal, and punched and swaged into shape at one operation by a machine somewhat similar in construction to a steam hammer mounting an inverted steam cylinder with piston and piston rod, the lower end of the latter carrying a head block, which slides up and down in fixed vertical guides, and carries the operating punches. The die block is mounted on an anvil supported by the base plate of the machine, and is furnished with a screw adjustment, whereby it is set in vertical position with the punches, which, acting in conjunction with the die block, punch the nut or washer, cut it from the heated bar, and swage and compress it into form simultaneously at one blow or stroke of the piston, and by the reverse stroke throw it out of the die box, the percussive action of the piston being so instantaneous that the punches and dies suffer no injury from the heat. The steam valve is worked by a rocking shaft, and the reversing gear is attached to the head block. Instead of steam, compressed air may be employed as a motive power.

[Printed, 10*d*. Drawing.]

A.D. 1855, February 5.—N° 265. (* *)

JOHNSON, JOHN HENRY.—(*A communication from Jackson Brothers, Petin Gaudet and Company.*)—This improvement consists in the substitution of cast-steel plates, bolts, screws, rivets, and other parts, for those of cast and wrought iron in the construction of boilers and other vessels. These plates are cast sufficiently thick to form after forging and rolling large sheets, in size equal to if not larger than the copper and wrought-iron plates now used for locomotive fire-boxes, or ordinary boilers. A considerable increase of lightness and strength will be produced, as the plates will be thinner than those of wrought iron. The manufacturing machinery, however, will require to be more powerful than that now in operation on iron and copper.

[Printed, *4d.* No Drawings.]

A.D. 1855, March 13.—Nº 557.

BOURSERET, EUGÈNE.—(*Provisional protection only.*)—This invention relates to machines arranged for manufacturing bolts, rivets, and screw blanks, treenails, and similar articles. A machine for forging mounts, a ram or punching hammer, which has vertical action above a horizontal revolving disc, wherein is fixed a circumposed series of sockets or dies, whereinto pieces of metal cut from a heated rod by the action of the disc respectively fall in rotation. The disc revolves on its vertical axis intermittently, after each movement stopping successively when by turns the dies containing the pieces of metal come directly beneath the punching hammer, which then immediately descends and forms a head on the piece of metal in the die beneath.

A machine for cutting the screws on bolts, mounts a number of horizontal shafts, which are caused to revolve with uniform velocity, and opposite these shafts is a vertical frame carrying a corresponding number of "chair bearers;" two clasps or hinges hold the bolts, and two carriers the screw nuts, a number of the latter being made to advance simultaneously by means of a rake, These arrangements may be modified.

A machine for turning the heads of bolts comprises a solid frame and four revolving arbors, which severally carry cutters. These cutters operate upon the heads of the bolts, which are placed in position beneath them, and held by means of suitable regulating screws.

[Printed, *4d.* No Drawings.]

A.D. 1855, March 14.—N° 571.

MARLAND, Jonas.—This is an invention of a machine designed for "producing the squares which form the couplings of " rollers used for drawing, spinning, doubling, and preparing " cotton, wool, flax, and other fibrous materials. The square is " first roughly forged in the usual manner. The roller (or the " bar which is to form the roller) is then placed in the machine " by which the square is to be completed or perfected. This " machine is furnished with a slide, which is actuated by a cam " or excentric on a shaft, which receives motion from a steam " engine or other first mover. On the slide are fixed two adjust- " able cutting or shaping tools, which when the machine is at " work operate simultaneously on two opposite sides of the " square. The machine is also furnished with appliances or " mechanism, by which the roller or bar on which the square " is to be completed is held and moved forward during the " process."

The invention is capable of "shaping metals for other pur- " poses, as, for instance, the nuts for screw bolts, whether square " or hexagonal, and also in any case where the piece of metal " admits of being acted upon by two cutting or shaping tools " which play upon two of its opposite sides at one and the same " time."

[Printed, 10*d.* Drawing.]

A.D. 1855, March 29.—N° 704.

JAMES, William.—(*Letters Patent void for want of final Specification.*)—This invention relates to the manufacture of screw-bolts, which may be driven into timber, and will take a secure hold therein. In the rolling process, whilst preparing the bars out of which these bolts are made, two feathers are raised respectively on opposite sides of the bar. These bars are cut into bolt lengths, whereon heads are formed by hammering in the usual way. Afterwards the bolts are reheated and then twisted, so as to convert the straight feather into a spiral thread. Instead of reheating and twisting the finished bolt, the bar may be twisted immediately after it is rolled, before it is allowed to cool. Otherwise the spiral thread may be formed on the bolts by means of dies.

[Printed, 4*d.* No Drawings.]

A.D. 1855, April 3.—N° 751.

GREENWOOD, Samuel.—This invention relates to machinery for making rivets, bolts, nuts, and similar articles from metal rods or strips. The machine first cuts the rods into suitable lengths, which fall alternately through each of the two separate channels of a forked spout, and are severally received by a circumposed series of dies. The dies are disposed apart at equal radial and segmental distances on a horizontal intermittently revolving circular platform, which is fixed on a vertical axis. At each movement of the platform, the dies in succession come exactly into position beneath the ends of the spout, and further on in their circuit, beneath two heading dies carried by plungers, which are actuated vertically by eccentrics on the main shaft. After the heading process the finished bolts as they come round in succession are by two rods pushed upwards out of the platform dies.

[Printed, 10*d*. Drawing.]

A.D. 1855, April 13.—N° 822.

HILL, Thomas.—(*A communication.*)—This invention relates to the manufacture of horse-shoe and other nails cut from wrought iron or other metal plates, specially rolled for the purpose, the heads being formed to project on more than two sides, or on sides not opposite, by the rolling and subsequent cutting operations.

One of the rollers employed is plain on the surface; the other roller is longitudinally grooved at intervals corresponding to the extreme length of two nails, for the purpose of raising a transverse ridge on the metal plate, and from an intermediate line between the grooves, the surface of the roller in both directions is gradually reduced, in order that the rolled plate may be thinnest at the intermediate line and gradually thicken towards the ridges. The plate is then cut transversely through the centre of each ridge, and intermediately across the thinnest part into strips, in width corresponding to the length of a nail. The strips by a subsequent operation are transversely cut into nails by a machine resembling the common punching press. The half ridge left along one side of each of the strips, forms the heads, a small portion being removed between the shank of each nail in order that the latter may gradually taper to the point.

The manner of rolling the plates may be modified.

[Printed 6*d*. Drawing.]

A.D. 1855, April 17.—N° 840.

FONTAINE MOREAU, Peter Armand, le Comte de.—(*A communication.*)—(*Provisional protection only.*)—This invention relates to apparatus for manufacturing bolts, nails, rivets, and similar articles, which in the heated state are made from bars of suitable metal. The apparatus comprises a machine in combination with a movable reverberatory furnace in which the bars are heated. An "advance box" receives the bars from the furnace, and moves them to a "compressing box," which gives to the end of the bar the rough shape of a bolt. The next operation cuts from the bar the piece so shaped, which then enters the "working "box," where by pressure the bolt is finished by means of a "rammer."

[Printed, 6*d*. Drawing.]

A.D. 1855, April 20.—N° 888.

NEWTON, Alfred Vincent.—(*A communication.*)—This invention relates to the manufacture of bolts and similar articles by a machine which operates by means of a series of pairs of dies forming two sets, the upper die of each pair in a set being mounted at the opposite side of a vibrating frame, to which they are respectively attached, and are alternately, by the reciprocatory movements of the frame, brought by means of an eccentric into co-operation with their companion dies, which by means of screws are fixed in sets to the top of the bed piece. The pairs of dies are variously formed for cutting, compressing, and shaping the bolt, some of the dies being formed in two parts adjustable by screws. The bar of iron out of which the bolts are to be made is square, and about the finished size of the head of the bolt; in a heated state it is entered between the first pair of dies, which operate by cutting away the metal to form the shoulder at each side of the head, which is left the original size of the rod, and by the successive operations of the several pairs of dies the bolt is gradually squeezed and brought to the form required, the dies which finish the shank being conical, whereby the metal is better drawn out without injury to its fibre. When the shank is formed, another pair of dies sever it from the rod, the last pair giving the finishing touch to the head of the bolt, which is presented to these dies by means of a pair of guides.

[Printed, 1*s*. Drawings.]

A.D. 1855, April 25.—N° 928.

BELLFORD, Auguste Edouard Loradoux.—(*A communication.*)—(*Provisional protection only.*)—This invention relates to a machine adapted to plane the sides of screw nuts, and bars of any prismatic form. The operating parts of the machine comprise a horizontal revolving disc mounted on a vertical axis, and a mandril which carries the nut or article under operation. This mandril has an intermittent rotating motion, each move or division being equal to a fourth, fifth, sixth or other part of a complete revolution, according to the required form of the nut or bar. The disc carries a series of cutting or planing tools vertically attached to its periphery, which is eccentric to its axis, having externally the form of a scroll, so that the radical distance from the axis of the cutting point or edge of each tool in succession gradually increases, equal to the side-by-side cuts of an ordinary planing machine. The nuts or articles to be planed are fixed on the mandril, which is brought into position beneath the planing tools. The disc being set in motion, each cutting tool in succession makes a cut outside the cut of the preceding tool, so that during one revolution of the disc, the whole of one surface or side of the nut is planed. At this point the mandril turns a divisional part of a revolution, bringing up the second side of the nut, which is planed whilst the disc makes the next revolution, and so on, the mandril moving one division to every complete revolution of the disc.

[Printed, 4*d*. No Drawings.]

A.D. 1855, May 12.—N° 1078. (* *)

DRAY, William. — "Improvements in the manufacture of "frames for all kinds of structures, together with the means of "fastening the same when necessary, part of which is applicable "to the manufacture of screws and bolts." The patentee describes the construction of a bedstead, "premising that the "principle of construction will be similar" in other articles. Over each of four tubular uprights "a four-way joint" is slipped and riveted thereto. The arms of the joints are hollow and form sockets for tubular side and end rails. Before insertion a broad piece of sacking is slid over one side and end rail, and two narrow pieces over the others; these are laced together. Hooks are passed over the uprights for the purpose of connecting them by cords to the corners of the sacking; or the parts are secured by "bands of metal provided with hooks and screws which extend "from end to end and from side to side." The head is composed of two metal rods having rings and plugs at the ends, and joined by strips of metal hinged to them at top and bottom. For hospitals or for reclining couches a moveable frame is added; it is composed of side bars with rings at the ends to slip over the uprights and with racks on their faces, and of a frame hinged to the other ends of the bars, covered with sacking, and furnished with supports which take into the racks. The screws and bolts are made hollow and threaded, and the heads are beat up, cast, or otherwise formed. Where no head is required they are threaded at both ends.

[Printed, 8*d.* Drawing.]

A.D. 1855, May 15.—N° 1099.

BOUSFIELD, George Tomlinson.—(*A communication.*)—This invention relates to the manufacture of wrought nails which, by the new process, are cut from heated metal plates rolled to a thickness corresponding with the required strongest part of the shank of the nail. The mechanism comprises a double set of parts, separately arranged to act alternately at opposite sides of the machine on tapering pieces of metal, so cut from the heated metal plate by a vibrating double edged cutter and the fixed cutter of each set of apparatus, as to taper in form alternately from opposite sides of the plate, which moves to the cutters, there being no intermediate loss or waste of metal between the successive cuts. Two gripping dies suitably formed and combined with a vibrating cutter, and two others with the fixed cutter of each set, by turns receive the cut pieces, and so mould them to the required form without elongating the metal, that if desired they may taper on the four sides, and as in the case of horse-shoe nails, have a slight swell at the head; the latter is formed at the thick end by a punch simultaneously with the gripping process, a nail being discharged from each set or side of the apparatus every successive stroke of the machine.

The cutters employed are of iron cast in chills; they and the dies are kept cool during the process by water, which is caused to flow upon them through suitable channels, while oil drops on the working parts.

[Printed, 2*s.* 4*d.* Drawings.]

A.D. 1855, May 16.—N° 1107.

JAMIESON, Robert.—(*Provisional protection only.*)—This invention relates to a machine adapted to forging the burrs or nuts for screw bolts, and applicable to the forging of blanks for bolts and pieces of metal for other purposes. This machine is somewhat similar in construction to an ordinary punching machine, mounting a vertical slide above a fixed die block. This slide carries two punches, simultaneously operating in conjunction with two dies fixed in position beneath, one for punching out the central hole in the nut, and the other corresponding with the intended shape of the nut, gives it external form. The end of a bar of iron previously brought to a red heat, is presented beneath the first punch, which as the slide descends punches the first hole; whilst the slide rises the bar is pushed forward so as to bring the first hole centrally under the shaping punch. On the next descent of the slide both punches operate, the first punching a hole for the next nut, whilst the second punch in conjunction with its die beneath, cuts the first burr from the rod; in this way the two punches respectively operate every return movement of the slide, completing the burr for one nut, and punching a hole in the centre of the metal which is to form the next.

[Printed, 4*d*. No Drawings.]

A.D. 1855, May 21.—N° 1132.

STOCKER, Samuel.—This invention, relating to various apparatus for shaping and working metals, consists:—

1st. Of a horizontal screw press, adapted for making a variety of metallic articles from pieces of tubes or plates, such as small cylinders for pumps, and cylinders or rings with annular enlargements and flanges.

2nd. Adapting ordinary upright fly-presses for producing union joints, gas fittings, and other articles, and applying such presses to other purposes.

3rd. Employing ordinary fly-presses to form necks or contractions on tubular pieces of metal, such as would be required for stems of candlesticks, pillars of lamps, and for other similar purposes and articles.

4th. Cutting screw threads inside and outside union joints, and such like goods. The articles during the operation are firmly held in a chuck fixed on the end of a horizontal mandril, which is revolved by a hand wheel, and whilst revolving is advanced longitudinally at a relative uniform speed by a master screw thread, which is cut on the mandril near the back end, and passes through the back headstock bearing, which is correspondingly threaded internally. The cutting tools are mounted on an adjustable tool holder, and their cutting point set in position for cutting or graving a line or lines either inside or outside the union, elbow, or article, and these lines so cut into the surface of the articles, resolve themselves into screw threads which are developed by the combined rotative and longitudinal movements of the mandril.

[Printed, 8*d.* Drawing.]

A.D. 1855, May 26.—N° 1197.

PARENT, Alfred Isidore Honoré.—(*Provisional protection only.*)—This invention relates to the manufacture of buttons, nails, and metallic and plastic articles which are shaped by drawing out under pressure. It is described by the inventor as follows:—

"I first cut out a blank in metal or in a plastic substance, as
" the case may be, of the weight of the article to be produced, and
" place this blank in a hollow mould to rough shape the article
" and then in a second mould to form it into its finished
" shape. The mould with the blank in it is subjected to strong
" pressure by a stamping press or otherwise, whereby it is drawn
" out under pressure, and made to assume the internal configu-
" ration of the mould. The shank in buttons is afterwards
" pierced by a punch or otherwise.

[Printed, 4*d.* No Drawings.]

A.D. 1855, June 6.—N° 1292.

HOPPER, George.—This invention of machinery for rolling and shaping metals, is especially designed for shaping such railway pins, as are described in the Specification of prior letters patent, granted to this inventor, March 13, 1854, No. 606, and is applicable to other purposes.

It "consists in the employment of a peculiar form of rolls for
" forming the square and round portions of such railway pins,
" which is effected by making one portion of the grooves semi-

" circular and another portion of the same grooves V-shaped, so " that when the semicircular portion of the grooves work together " the round bolt or pin may be held therein by a pair of tongs " during the revolution of the rolls; but when the V-shaped " portion of the grooves come round, they of course form a square " aperture, and, by nipping the round bolt or pin between them, " such bolt or pin having been previously heated, they transform " the circular portion into a square section, the length of such " square sectioned portion corresponding to the length of the " V-grooves; the bolt will thus have one part of its length round " and the other square, and may be passed through successive " grooves to reduce it to the required size. Although these swaging " rolls have been described merely for manufacturing railway " pins, yet they are obviously applicable to the swaging of other " articles by modifying the forms and lengths of the grooves on " the rolls."

These rollers consist of three separate parts, viz., the central spindle, the body of the rolls which are furnished circumferentially with half round grooves, and segmental die pieces which are fixed into a dovetailed recess cut longitudinally across the grooves in the periphery of each roll. These swaging or die pieces carry the V-grooves in a line with the half round grooves in the rollers, and they may be changed to suit the size and nature of the work, and the form required.

[Printed, 8*d*. Drawing.]

A.D. 1855, June 15.—N° 1367.

BRIDGEWATER, HENRY.—This invention relates to the manufacture of railway spikes, adapted for fixing the chairs to the wooden sleepers of the permanent way. These spikes are made from plates of iron of varying thickness, produced by corresponding inequalities in the surface of the rollers employed in their manufacture. The finished spikes are tubular. The plates are cut into pieces of suitable form, and when severally heated to a welding heat, each piece is bent to the form of a skelp; it is then placed in a heading die and hammered, whereby the lips of the partially formed tube are welded together, the thinnest part of the plate forming the point or end which enters the wood, and the thickest part forming a head of sufficient strength to withstand without injury the heavy blows of the workman's hammer.

Spikes may also be made tubular from plates of uniform thickness, having a solid piece welded into one end to form the head.

[Printed 6*d.* Drawing.]

A.D. 1855, June 22.—N° 1435.

BELLFORD, AUGUSTE EDOUARD LORADOUX.—(*A communication.*)—This invention relates to screw fastenings for use where ordinary bolts and nuts cannot be conveniently applied. The head or stem part of these bolts or fastenings which enters the wall or place, is wedge shaped or formed longitudinally with inclining surfaces. To these surfaces are fitted sliding wedge pieces which diverge or expand laterally when longitudinally moved by the screwing up of the nut, whereby the bolt is made to fit tightly in the hole in which it was loosely placed. The same result is effected by forming the nut (which is to be placed in the hole) with similar inclines, and fitting it with expanding wedge pieces of corresponding form, the bolt in this case being screwed into the nut. The wedge pieces are fitted along the sides of the bolts, and confined by an expanding ring.

[Printed, 8*d.* Drawing.]

A.D. 1855, August 3.—N° 1759.

FULLARD, GEORGE HENRY.—(*Provisional protection only.*)—This invention relates to the manufacture of screwed thatch pins of metal, such having been heretofore made of wood. It is described as follows :—

"Whereas the pins now used in thatch coverings, and more
" especially in those applied to stacks and ricks, from being
" made of wood, and of an even surface, are liable to fall out;
" now my invention consists in forming the pins of metal with
" a worm or screw at that end where the pin is to enter the
" thatch. At the opposite end I form the pins with a flat head,
" over which an instrument or handle may be placed to screw the
" pin into the thatch, or a permanent handle may be made in one
" piece with the straight part of the pin. In order to prevent
" oxidation, I find it better to form the pins of galvanized iron,
" though I reserve to myself the right to make them in any
" metal."

[Printed, 4*d.* No Drawings.]

A.D. 1855, August 10.—Nº 1818.

LATOUR, PHILIPPE, and LATOUR, MAURICE.—This invention, relating to the manufacture of shoes, consists of a machine which combines two operations, viz., cutting shoe nails, and successively driving them into the sole of the shoe.

"The first movement is worked by means of a hooped eccentric placed on the motive shaft, which, by means of a connecting rod, a ratchet wheel, and a bevelled tooth wheel, gives the impulse to a little spring wheel, throwing into gear an internal rack of the same shape with the shoe. This rack is placed under a slide moving on the machine table. On this slide the shoe to be nailed is laid. The second movement is worked in the same manner, by means of a hooped eccentric giving an alternate impulse to a rod or arm on which the sheet iron to be cut is placed. This sheet iron at every oscillation lays its edge on a small flange projecting on a double tube, funnel-shaped, placed beneath. The third movement is worked by a fixed cutter behind the sheet iron plate, and before it there is another unfixed cutter moved by two cogs. The two cogs are alternately acting on a roller that the unfixed knife bears at its end, causing it to advance towards the fixed knife. The former either cuts the nail, or recedes to allow the rod or arm to oscillate. The nail drops on either one side or the other of the double tube, and with its sharp end downwards, its oscillation being caused by a small projection, which causes its thickest end to stand upwards, and thence descends into a simple tube that leads it on the shoe. At that time an eccentric allows a rod, urged by a strong spring, to pass through its grooved part. This rod bears at its end a puncheon that drives the nail into the shoe, and is immediately raised up by the eccentric, the shoe then advances, yielding to the first movement above described."

[Printed, 8*d*. Drawing.]

A.D. 1855, August 16.—Nº 1859.

SHANKS, ANDREW.—(*Provisional protection only.*)—This invention relates to a machine for cutting and shaping nuts. It is described by the inventor as follows:—

"I employ a revolving cutter placed on a mandril, the nut being fixed on a similar mandril, but revolving in a contrary

" direction, the axes of both mandrils being on the same plane;
" one of the mandrils has a sliding or vibrating movement, so as
" to permit the nut being shaped to the pattern or template
" affixed thereon."

[Printed, *4d.* No Drawings.]

A.D. 1855, October 8.—N° 2243.

ROTHERA, William.—This is an invention of machinery for manufacturing bolts, screw blanks, rivets, and similar articles from metal bars or rods. These bars, somewhat larger in diameter than the intended size of the stem or shank of the article under process, are used up in a heated state, the operating parts of the machine being actuated by a series of eccentric cams on the main cam shaft, the end bearing of which is capable of yielding to any excessive pressure. The part forming the shank is first compressed between two swages, the length being determined by a movable bar. The swages then move with and present the bar to the cutter, which separates the bolt piece they hold from the end of the bar, leaving sufficient additional length projecting to form the head. A further motion of the swages brings the projecting end into position, opposite a ram with an outer slide or socket die; this die slides over the projecting end of the bolt piece, and the ram, by pressing internally endwise against it, causes the projecting end of the piece to fill the socket die by its lateral expansion. The bolt or article being finished, is struck out of the die and swages by a hammer, and the parts then return into position to repeat the operation.

[Printed, *10d.* Drawing.]

A.D. 1855, October 18.—N° 2334. (* *)

WAKEFIELD, John.—Improvements in machinery for making screw blanks, nails, pins, rivets, &c., viz.:—

1. The use of "two adjusting screws, wedges, or stops, which
" may either be fixed one at each end of the feed bracket or on
" the feeding slide. These stops can be adjusted so as to regu-
" late with the greatest nicety the quantity of wire or other mate-
" rial fed into the machine at each motion."

2. "A relief lever or clutch applied to the feed rod by which
" the risk of bending or doubling up of the wire" is avoided,

" as the relief lever or clutch opens upon the application of an " extra strain and the machine ceases to feed."

3. " Adjustable slides for affording a nearly continuous bearing " for the wire or rod to be made into blanks, and thereby per- " mitting the working up of the ends of the said wires or rods ;" also a method of dovetailing the end of a wire to be introduced to " the end of the wire already in the machine."

4. A counter to register the number of pins or other articles turned out by the machine.

[Printed, 8*d*. Drawing.]

A.D. 1855, November 6.—N° 2490.

GOOSE, Richard.—This invention relates to the manufacture of cut nails from narrow sheets or strips of iron, cut from sheets in a direction transverse to the grain of the metal, as formed by the rolling process. These strips are passed between rollers so eccentrically mounted on their axes, that, as the rollers revolve, their peripheries mutually approach and recede. This arrangement of the rollers is for the purpose of forming a thick and thin edge to the narrow plates or strips, which are passed between the rollers in a position parallel with their axes. The nails are taken by the ordinary cutting process, transversely from the end of these feather-edged strips, in parallel cuts, the crosswise gradual diminution in the thickness of the plate giving the taper form to the nails, thereby obviating the necessity for cutting at alternate angles, or turning over the plate or strip every alternate cut.

[Printed, 6*d*. Drawing.]

A.D. 1855, November 9.—N° 2523.

FLETCHER, Henry.—This is an invention of machinery adapted to the manufacture of nuts, bolts, and similar articles. To make square unscrewed nuts, a punching machine is combined with a circular saw or disc, which, whilst rotating on its axis, is caused to advance at regular intervals, and recede from the iron or other metal bar, each movement cutting a piece from the end of the bar, in length corresponding to the breadth of the latter, and to the required size of the nut. A vertical action punch then descends and punches the central hole before the shifting of the nut, which may also if desired be further shaped by a shaping apparatus, mounted to act in conjunction with the machine. Two saws may be mounted in the machine, so that two bars may be operated upon simultaneously, whilst one punch with accelerated motion operates in conjunction with both. For making hexagonal nuts, bars of corresponding form are used; as soon as the nut pieces are cut off by the saws they are caused to fall on their sides, in which position the central hole is punched.

Compound bolts applicable to fish plate joints used in connecting railway rails, are made from one piece of iro[illegible]ght-angularly bent, by means of an anvil block and swage, somewhat into the form of a staple, the ends thereby forming two bolts connected by an intermediate cross piece or portion of the bar, which portion acts as a head to both.

The bars employed for making bolts or spikes requiring heads are first rolled between rollers, so grooved as to form or raise at suitable intervals on the rod, thick places containing sufficient metal to form the heads.

[Printed, 10*d*. Drawing.]

A.D. 1855, November 15.—N° 2580.

MORRISON, Duncan.—This invention relates to "an improve-
" ment in the manufacture of articles with internal screws, when
" cast iron, malleable cast iron, or cast brass is employed. For
" this purpose wrought iron tubing is used, in which the internal
" screw is by preference first formed, but the screw may, if de-
" sired, be cut after the cast article has been made. The wrought-
" iron tube is placed in the mould, and the melted cast iron or
" malleable cast iron or brass is run into the mould, so as to be-
" come connected with the tube or tubes of wrought iron."

The object of the "invention is to obtain hollow or internal
" screws of wrought iron in articles of cast iron, malleable cast
" iron, and of cast brass, in order thus to produce stronger screws
" in articles so made than if the screws were made or tapped in
" holes drilled or formed in the mass of cast metal of which the
" cast articles are composed. In carrying out my invention, I
" prefer to have the screws formed on the interior of wrought-
" iron tubes; the exterior form, however, of the tubes is not
" essential, though ordinarily I use them of a cylindrical external
" form."

[Printed, 4*d*. No Drawings.]

A.D. 1855, November 22.—Nº 2639.

MAY, Charles, and PRINCE, Paul.—This invention relates to the manufacture of spikes and treenails, which heretofore have been made hollow out of iron rolled to a uniform thickness.

According to one part of this invention the iron employed for making these hollow spikes and treenails is rolled of unequal thickness, in order that the portion which forms the heads may have more substance, and consequently more strength than the point or end which enters the wood. The other part of the invention relates to the form to be given to the spike, the pointed end of which in its finished state terminates obliquely, and resembles "a quill toothpick."

A machine is described for turning the blank pieces of rolled metal to the required form. It effects this operation by means of a powerful pair of pincers with segmental limbs operated by gearing, and a mandril, round which the blank is turned by percussion or pressure, and brought to the form of a tube, the adjacent edges being welded together if desirable.

The turning of the blank may also be effected by means of one fixed and two movable rollers, which convergently close upon the blank.

Other modified forms of these spikes and treenails are described and illustrated.

[Printed, 10*d*. Drawing.]

A.D. 1855, December 11.—Nº 2801.

NEWTON, Alfred Vincent.—(*A communication.*)—This invention relates to a machine so adapted to the manufacturing or forging of bolts as to insure the upsetting of the head centrally in relation to the shank. "The die which receives the heated "metal to be forged into a bolt is carried by a holder, which is "hinged to the main framing, and is capable of being thrown "out of the vertical to facilitate the insertion of the metal, and "subsequently the discharge of the forged bolt. Passing up "through this holder is a plunger, which rests upon a rocking "lever, the fulcrum of which is in advance of the hinge of the "holder. This arrangement ensures the rising of the plunger, "(which carries a rod of a diameter corresponding to the shank "of the bolt) to force out the bolt from the die, simultaneously "with the movement of the holder, out of a vertical position, to

" admit of its discharge. That portion of the holder to which " the die is attached is tubular, and is capable of turning on its " axis by reason of a cog wheel gearing into a ring of teeth " formed upon it."

"Immediately above the die in which the heated metal is " placed is the heading tool, which carries at its extremity a " loose sleeve or guide. This guide on the descent of the heading tool first reaches the die, and, surrounding the heated " metal contained therein, acts the part of a mould or die to the " metal, which is struck up by the heading tool to form the " head of the bolt. To prevent this guide from drawing the " bolt out of the die on the ascent of the heading tool, a slight " axial motion is given to it just prior to the upward movement, " by reason of an arm striking against a projection on the sleeve " or guide. The heading tool then rises out of the way." A pair of dies by means of a knuckle joint arrangement advances horizontally, and by striking on opposite sides form the head, the amount of the axial movement of the bolt holder being regulated to form the head either square or hexagonal.

A modification of this arrangement is described.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1855, December 19.—N° 2870.

ROSS, George, and WILKES, Thomas.—This is an invention of machinery adapted to "the manufacture of bolts, rivets, spikes, " screw-blanks, screws, nuts, and screws and washers." The pieces of iron which by turns are cut from the heated rod by circular saws, are in succession placed between a pair of dies, that form the stem or shank by sliding horizontally between inclining surfaces towards the heading punch, which then operates to form the head whilst the piece is firmly held by the dies. When the head is formed, the dies in the act of retiring open to discharge the rivet or article, and to receive the next piece which is cut off by the saws, the operation being repeated every succeeding action of the machine.

The pieces of metal to form nuts and washers are cut off in the same manner and fashioned between a pair of dies; the upper die is movable, and the lower die is furnished with a central pin which punches the holes. After every operation the bottom of the latter die is caused to rise and discharge the newly-made nut or washer.

Threads are cut upon screw-blanks by a tool which is so fixed at the face of the screw plate that it roughly forms the thread on the blank before the latter enters the screw plate, which finishes the operation.

[Printed, 8*d*. Drawing.]

A.D. 1855, December 28.—Nº 2941.

TURNER, JOHN PEMBERTON.—(*A communication.*)—(*Provisional protection only.*)—This invention relates to a mode of attaching shanks to metallic buttons, and ornamental and other heads to the shanks of nails and other articles. The metal blank which is intended to form the head is cut out in the usual manner, the cutting tool forming a depression in the centre, which is afterwards deepened by a stamp, the metal of the blank being pressed towards the centre and raised round the depression, into which the end of the shank is inserted. Thus partially formed, the button is again subjected to the action of a stamp, which closes the metal round the shank, the latter becoming by the last operation firmly fixed to the button, any design on the face of the button being produced at the same time by the stamp.

Ornamental or other heads of nails may be attached in the same way, and articles having separately formed heads may have them attached by this process.

[Printed, 4*d*. No Drawings.]

1856.

A.D. 1856, January 2.—Nº 8.

SHANKS, ANDREW.—This invention relates to screw cutting apparatus, to the construction of the dies employed, and to the manner of operating. The operating parts of the machine, which resembles a lathe head stock, are mounted on a single pillar frame. The mandril is hollow and carries on its fore end an internal geared wheel, which is actuated by a driving pinion. Fixed projecting from the face of this wheel is an arm, to which at its free end the carrier frame and dies are attached. This arm is bent so as to bring the dies coincident with the axis of an internal spindle, which passes through and has liberty to slide endwise in the mandril, at the same time that it is caused to reciprocate on its axis, by an arm fixed on its back end and connected to a crank pin on the driving shaft. The screw to be cut is carried projecting from the end of the spindle in a direct line with the dies, which are revolved with the bent arm. By means of a right and left handed screw, the dies are opened and closed.

Six pairs of dies, all differing in size, are formed in the respective sides of a pair of hexagonal plates, which shift round on central studs fixed to the carrier slides. When set for use, according to the required size of the screw, the sides carrying the corresponding dies are brought round and pressed together by screws. A pair of the hexagonal die plates is shown as adapted to hand stocks.

[Printed, 10*d.* Drawings.]

A.D. 1856, January 22.—N° 166. (* *)

FONTAINE MOREAU, PETER ARMAND LE COMTE DE.—(*A communication.*)—" Improvements in machinery or apparatus " for manufacturing nails."

" The invention consists, firstly, of an improved method of " flattening the wire, by means of a system of levers, which cause " suitable steel dies to act upon the wire in opposite directions; " secondly, of improved means for further shaping, heading, and " cutting the nail."

"To a cast-iron frame or standard is fixed a shaft, working in " suitable bearings, and carrying a fly wheel and fast and loose " pulley for giving motion to the machine. Upon this shaft are " placed a series of cams, one of which actuates a lever of the " second kind. To this lever is attached a connecting piece, " which connects two levers together. The fulcra of the latter " are so placed as to cause two steel dies to meet and press the " wire in opposite directions, this being the first operation in " forming the nail. By means of a cam on the shaft, another " lever is brought into action, for giving by suitable steel sliding " dies an angular or round shape to the shank or stalk of the " nail. Two other cams acting against suitable levers then cause " the sliding steel cutters to come into action, which hold, cut, " and finish the shank or stalk of the nail at the same time it is " being headed by the header or hammer. This header works

" horizontally between suitable guides. One end is provided " with a slot, in which works a cam on the shaft, for giving, in " combination with a wooden spring, a suitable movement to the " header. At its opposite end is placed the steel die, which heads " the nail and finishes the operation. The levers are furnished " with antifriction rollers, against which the cams work. The " wire is fed in by suitable apparatus."

" This machine is adapted for manufacturing horse-shoe and " other nails of various shapes and metals."

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1856, January 25.—N° 196.

TOLHAUSEN, Alexandre.—(*A communication from Hans Rees, John Loudon, and Otto Ahlstrom.*)—This is an invention of a machine adapted " for boring and other cutting operations in " stone and other mineral substances. . . . This machine is " applicable to a variety of boring and internal cutting purposes, " but is only intended to be used in operating within a hole " which has been previously drilled or bored by some other " means. It is capable of enlarging and making perfectly true " the irregularly-shaped holes which are produced by the drill, " which is most commonly employed for drilling stone. It is " also capable of producing a large chamber of almost any shape " at the bottom of or at any distance from the mouth of a small " hole to contain a large charge of powder for blasting purposes, " or to serve any other purpose. It is further capable of enlarging " the lower part of any hole for fastening a shaft, pillar, or other " support therein. It may also be employed to cut a screw thread " in the interior of a hole, and it may serve to perform many " other useful boring and internal cutting operations."

The machine operates by means of a cutter so fitted into a recess formed in the end of a boring bar, that it can be projected laterally by the aid of a bolt, which is fitted to slide in a groove longitudinally cut in the rod. Several modifications of these cutters are described and illustrated.

[Printed, 8*d.* Drawing.]

A.D. 1856, January 25.—N° 202.

PEAK, Joseph.—(*Provisional protection only.*)—This invention relates to apparatus adapted for pointing bolts, turning bolt heads, facing nuts, centering, drilling, and similar operations.

The apparatus is somewhat similar to a back geared lathe headstock mounted on a short bed whereon, placed opposite the end of the spindle, is a standard that carries a pair of sliding jaws, which are caused to open or close upon the article under operation by means of right and left handed screws. The tool or cutter is mounted on the end of the spindle and revolves therewith.

[Printed, 8*d*. Drawings.]

A.D. 1856, January 31.—N° 257.

HOLFORD, Henry, and MASON, Mark.—This is an invention of machinery for compressing metals, and making all kinds of rivets, bolts, and similar articles. The machine has compound action, making rivets or articles alternately at each end by means of a central sliding frame, which is furnished with two heading punches, one at each end. This sliding frame receives its motion direct from an eccentric fixed on the top of a vertical shaft, which is caused to revolve by bevel spur gearing beneath the bed plate. Formed across the centre of the sliding frame there is a long rectangular slot, wherein the steps which embrace the eccentric have transverse liberty to slide, but being confined by the sides of the slot in the other direction, a reciprocating movement is imparted to the frame. To act in conjunction with the two heading dies there are on horizontal axes, two intermittently revolving die holders, each carrying a circumposed series of six dies, and into these dies by turns are fed from a hopper by movable fingers, counterpart pieces of heated metal, which have been cut in uniform lengths from the rod. Each movement of the die holders brings an empty die opposite the hopper to be loaded with a fresh piece of metal, moves the die last loaded opposite the heading punch, and carries the rivet or bolt last formed opposite the end of a thrusting mandril, which advances and pushes it out of the die. These movements take place alternately at each end of the machine every revolution of the eccentric.

[Printed, 10*d*. Drawing.]

A.D. 1856, February 11.—N° 354.

HARFIELD, William Horatio.—(*A communication.*)—This invention relates to a machine adapted to the manufacture of metallic blank nuts for screws. This machine forms nuts of various sizes by means of an adjustable nut or mould box, which contains in a circular frame, an arrangement of as many segmental pieces as there are sides to the nuts it is intended to make. This box constitutes the mould which confines and shapes the sides of the pieces of heated metal, whilst two dies advancing from opposite directions press on it and shape the top and bottom. Combined with these dies are two internal punches, which are projected from the centre of the two dies respectively against the centre of the nut; as these punches advance towards each other to make the central hole, they displace the metal from the centre of the nut and cause it to spread laterally, thereby filling every part of the mould. The thin wad or piece of metal which remains in the centre of the nut between the punches is forced out by the continued advance of one of them, after the other has ceased to act. The nut pieces are cut in succession from a heated rod, and if at any time a piece contains more metal than the mould will hold, the parts which force up the dies are capable of yielding, and thus avoid injurious straining or breakage. The operating parts of the machine are readily adjusted to make nuts of different size and varying in thickness, and their movements are timed and regulated by eccentric cams.

[Printed, *3s. 4d.* Drawings.]

A.D. 1856, February 20.—N° 426.

MUIR, William.—This invention, relating to lathes employed for cutting screws, consists in adapting for use in such lathes one or more additional slide rests, "each slide rest being worked inde-" pendently of the other or others by the main screw of the lathe. " The object of these improvements is to economise time and " labour in turning or screw cutting, as two or more cutting tools " may thus be employed, and each tool is capable of being ad-" justed laterally and for the depth of the cut, independently of " the other or others. In cutting screws, the apparatus for with-" drawing the tools and for regulating the depth of the cut may " be connected, so that both tools are withdrawn from cutting " and reinserted simultaneously." By this means two or more tools may be employed at one time, cutting at different parts of the same screw or sliding the same shaft.

[Printed, *10d.* Drawing.]

A.D. 1856, February 22.—N° 457.

BOWER, Leonard.—The object of this invention, which relates to apparatus for cutting the threads on screws, is to form such screws with tapering ends, the thread continuing to the point. To this end, turning tools or cutters, and a gauge or stop, are used in combination with the ordinary worming dies generally employed. On the side of one of the worming dies are placed two or more cutters of a shape suited to produce a screwed tapering point to the blank; these cutters are held by the die holder, and they are fixed and adjusted by the screw which fixes and adjusts the die. A guide or bearing which supports the blank laterally whilst the opposite cutter forms the screw point, is attached to the other or opposite worming die. The blank enters between and retires from the dies in the usual manner, the cutters during the closing of the dies, tapering and threading the blank to the end, so as to give to the end of the screw the form of a gimblet point.

[Printed, 6*d*. Drawing.]

A.D. 1856, February 26.—N° 487.

HENN, Samuel, and HADDON, Thomas.—This invention relates to ornamental nails, the heads of which are formed of metal different to that which forms the shanks, such for example as brass headed nails. The shanks are made from iron wire, cut into lengths, and pointed by any of the well-known processes. The head may be partially formed and left rough, or the end of the shank may be cut or nicked. The shanks are placed points downwards in rows of holes in a plate, and guided into sand, metal, or any other kind of moulds, made by a system of plate casting from a series of patterns of shanks and model heads of the finished size. Molten brass or other metal is then poured into the moulds; the metal flows round the partially formed head of each shank and attaches itself thereto. When taken out of the moulds the sand is brushed off and the heads are made smooth, burnished or ornamented, by pressure between dies, for which purpose it is proposed to place them radially in a series of holes or dies formed at equal distances apart in the periphery of a thick intermittently revolving disc, which is mounted in the machine upon a horizontal shaft, directly beneath the main die. This die has vertical action given to it by a lever, which obtains motion from a cam on the main shaft of the machine. The revolving disc is moved intermittently by a ratchet wheel, and as in succession the nails in the disc dies come round and stop by turns directly beneath the main die, the latter descends, and according to its style or form imparts the desired configuration and finish to the nail heads. The heads of small nails are covered with circular pieces of thin metal, which by means of dies are pressed into the required form on the head of the nail, and made at the edge to lap over a kind of thin washer, which is placed beneath the head.

Different kinds of nails with heads varying in style or form are described and illustrated.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1856, April 2.—Nº 790.

GRICE, FREDERIC.—This invention relates to machinery for making from rods of iron, bolts, rivets, spikes, screw-blanks and nuts. The pieces of metal cut to the required length from the rod, are, while in a heated state, by turns dropped into the next one in succession of a series of dies, severally circumposed at equal radial and segmental distances, in the upper surface of a horizontal intermittently revolving disc, which turns on a vertical axis fixed projecting upwards from the bed plate. These dies in the disc as they are by turns loaded, come in succession under a plunger, which carries at its lower end a moulding die combined with an internal punch. The position of the plunger as it moves up and down, is maintained by vertical guides attached to the frame, and motion is imparted to it by a crank shaft above. Each successive movement of the disc brings the next die in rotation loaded with a fresh piece of metal under the plunger and moulding die, which descends and incloses that portion of the piece of metal, which is left projecting upwards from the loaded die to form a head to the bolt. The punching die contained in the moulding die now descends upon the top of the piece of metal, and forms the head, the moulding die limiting the amount of the lateral expansion of the metal. When the combined moulding and punching dies rise, the bolts in rotation are pushed upwards out of the lower dies by a rod. Rods out of which hexagonal nuts are made, are laterally compressed by dies, whereby four sides of each nut are roughly formed, the other two sides being attached, are separated by a transverse cut. These nuts are finished and the central hole is punched by the machine, which is furnished for the purpose with a modified arrangement of the punches and dies.

[Printed, 8*d*. Drawings.]

A.D. 1856, April 18.—N° 922.

WESTLEY, William.—This invention relates to the making of nails or spikes which, for about three parts of their length, are split up from the point or end which enters the wood or material. The two halves which form this duplex end are chamfered inwards obliquely, for the purpose of causing them, when the spike is driven, to diverge in opposite directions, and this mutual bending outwards, by reason of the shape of the duplex end, materially assists the spike to hold firmly in the wood when driven home, the two ends or fangs then being widely separated. The parts to form spikes with two or any number of fangs may be united together by welding, the head to be fashioned out of the welded portion, and when in the first instance they are made solid, they may be divided by a saw, or slit up by any other means.

A variety of transverse sections or split spikes of various forms are exhibited in the drawing.

[Printed, 6*d*. Drawing.]

A.D. 1856, May 2.—N° 1042.

NAYLOR, William.—This invention relates to power or steam hammers, to rivetting machines, and to the adaptation of steam-power hammers to the manufacture of bolts and rivets. As regards steam or power hammers, the invention consists in the use of a piston-rod, which passes through the piston and into a socket or cylindrical guide at the top of the cylinder, the upper end of the rod and the guide being so grooved or otherwise correspondingly shaped, as to prevent the piston turning round when the hammer is at work. When used for the purpose of rivetting, two double-acting power hammers are employed.

When the steam hammer is employed for making rivets or bolts, a circular disc or block, having at regular intervals in its periphery holes in the direction of its axis, which form a circumposed series of dies, is added as an auxiliar to the steam hammer. This circular die-block is mounted upon the anvil on a horizontal axis, directly beneath the hammer head. The rivet pieces in a heated state are fed into the holes in the periphery of the die-block, which, whilst resting during the formation of the heads by the blow of the hammer, is held by a bolt, which, by means of a spring, is projected by turns into one of a series of openings in the side of the die-block, thereby detaining the die holes with the rivet pieces in succession directly beneath the hammer head. During the operation the die-block is kept cool by jets of water which flow into the side openings, and as the block revolves, the finished rivets, thereby cooled and contracted, fall out of the dies.

[Printed, 1*s.* 4*d.* Drawings.]

AD 1856, May 5.—N° 1055.

BLOOMER, CALEB.—(*Provisional protection only.*)—This invention, relating to the manufacture of spikes and bolts, is supplementary to a prior invention, Letters Patent for which, bearing date March 3, 1854, No. 522, were granted to this inventor, who in the specification of the said prior invention proposes to make bolts and spikes by any ordinary means, and afterwards to slit them a portion of their length from the point upwards.

According to the present invention split bolts are made by welding or fixing together two pieces of rod or bar iron; these pieces are laid together side by side, and welded or otherwise united at the part which forms the head, and the union may extend to a portion of the length, thereby avoiding the subsequent splitting process.

[Printed, 4*d.* No Drawings.]

A.D. 1856, May 8.—N° 1086.

NEWTON, WILLIAM EDWARD.—(*A communication.*)—This invention relates to cutting, punching, and forging or swaging nuts and washers.

By the machinery employed, "the nut blanks are formed from " a bar of heated iron of suitable size, which is presented to the " face of a die, and in succession pushed forward against a " gauge by an operator. A nut blank is cut off from the end of " the bar by a punch and die of the form of the circumference " of the nut, and as this is forced through and discharged by " the continuation of the same motion, and by another and " parallel punch, the hole is punched in the bar for the next " nut blank. As the nut blanks are in succession discharged " from the die in which they are cut, they are taken by a pair of " jaws and transferred to and held in front of a central mandril,

“ which is forced into the central hole thereof, in order to hold
“ and turn it during the after operations. The punched and
“ cut nut being thus held and turned by the mandril, it is
“ swaged on the two faces by sliding swages, which are operated
“ in the line of the axis of the mandril, and it is also forged on
“ the edges by two hammers, which work in opposite directions,
“ but simultaneously, and at right angles to the axis of the
“ mandril, which is occasionally turned in order to present the
“ several faces of the nut to the action of the hammers, whether
“ the nuts be square, hexagonal, octagonal, or of other number
“ of sides; or, if round, to present in succession the several
“ parts of the circumference. The faces of the hammers may be
“ constructed so as to form two of the faces of the nut at the
“ same time.”

[Printed, 8*d*. Drawing.]

A.D. 1856, May 12.—N° 1120.

NEWTON, William Edward.—(*A communication.*)—This invention relates to machinery adapted “for splitting or cutting “ blocks of wood” for match splints, treenails, and other purposes. When the machine is employed for making match splints, a crimper for matting the under side of the wood block is required, but when employed exclusively for splitting blocks for treenails, or kindling-wood, the use of the crimper is discontinued. The machine operates by means of four knives or cutters which intersect at right angles each others cut. The blocks are carried forward by a feeding apparatus, consisting of an endless chain plate or table upon which the blocks are placed and during the operation of the cutters are held firmly and steadily by a presser plate, which is lifted after each cut to permit the intermittent forward movement of the blocks by the feeding apparatus.

[Printed, 10*d*. Drawing.]

A.D. 1856, May 14.—N° 1144.

HARFIELD, William Horatio.—(*A communication.*)—This invention relates to “machinery for cutting and smoothing the “ surfaces of metallic nuts.”

“ A rotatory wheel or disc having cutters on its under side is
“ mounted on a suitable upright shaft, provision being made for

" pressing such wheel or disc into action by the elasticity of " a spring coiled round the shaft or axis. The upright axis or " shaft receives rotatory motion in any convenient manner. The " metallic nuts to be cut or smoothed are placed on pins fixed " to the links of an endless chain, which is carried by and " receives motion from chain wheels. The part of the chain " which is for the time being uppermost is supported at the " bottom of a grooved or bent plate fixed on a grooved table. " The groove of the bent plate has inclined sides. The nuts, as " they are moved by the chain under the wheel or disc, are sustained by two plates, one on either side of the groove, and the " nuts are guided by the edges of two other plates, which are " adjustable to accommodate for different sizes of nuts."

[Printed, 10*d*. Drawing.]

A.D. 1856, May 17.—N° 1169.

NEWTON, ALFRED VINCENT.—(*A communication.*)—An invention of " machinery for forging or pointing wrought nails, " spikes, and other four-sided articles " by means of two hammers operating simultaneously on the opposite sides of the article under process, and acting conjointly with a roller that presses upon the top of the article, which rests upon a suitable formed anvil. The two hammers have steel faces, and, striking together from opposite directions, the blow of one offers the necessary resistance to the other, as they close and nip the article between them. The return action of the hammers is effected by springs, but they are driven forward to strike by two inclining surfaces, respectively on the contiguous faces of two cam wheels, which are provided with heavy rims in order that they may act also as fly wheels. These wheels are mounted on a horizontal shaft, whereon also is fixed the bolt or arm which carries the pressing roller. The hammers and the rollers act alternately, the article being raised off the anvil whilst the hammers strike, whereby the formation of burrs or fins on the edges of the nail is prevented.

The iron bar, out of which the articles are formed, is fed to the machine by hand, the operator pushing it forward when necessary. The arrangements of the pressing roller may be modified.

[Printed, 6*d*. Drawing.]

A.D. 1856, May 23.—N° 1241.

DIMPFEL, Frederick Peter.—(*A communication from Kingston Goddard.*)—The object of this invention, which relates to the manufacture of screw nuts for axle boxes and for other purposes, is to provide means for preventing the loosening or unscrewing to which such nuts are liable, by reason of the vibration and shaking they have to undergo. To this end, within the under side of each nut is formed a cavity whereon is a "small "clutch lever or tooth cam," which engages with the thread of the screwed axle or bolt whereon the nut is placed, and grips it firmly. The toothed end of the clutch lever, which centres on a fixed pin, is kept in position in contact with the thread by a spring that presses against the tail of the lever, whereby the unscrewing of the nut is prevented. When required to loosen the nut, it is effected by the aid of a pin, which is passed into the nut from the outside, and pressed against the tail of the lever and the spring, whereby the toothed end of the lever is disengaged from the thread on the axle or bolt.

[Printed, 6*d*. Drawing.]

A.D. 1856, June 5.—N° 1339.

NORRIS, John, junior.—(*A communication.*)—This invention is supplementary to a prior invention relating to the manufacture of wrought nails, which was communicated by the same person to G. T. Bousfield, who obtained the letters patent bearing date May 15, 1855, No. 1099. The present invention relates to the tools employed for cutting from the heated iron plates the pieces which form the nails. These tools were made of ordinary iron cast in chills, the cutting edges being brought into form and sharpened on a "lap." According to the present invention, instead of using for the cutters one description of ordinary iron, a mixture, consisting of one half of the best sterling iron incorporated with one half of the metal known as malleable iron, is employed; or equal parts of the metals known as white and gray iron. The cutters are as heretofore cast in chills, and dressed or faced as before described. The exact proportions of the two metals given above may be altered.

[Printed, 4*d*. No Drawings.]

A.D. 1856, June 5.—N° 1342.

SINCLAIR, Archibald.—This invention relates to the manufacture of the pins or spikes used on railways for fastening the iron chairs to the wood sleepers, the object being to produce a spike which may be driven without splitting the sleeper when no hole is bored. Instead of being made solid, and circular or polygonal in transverse section, they are fluted from the point to beneath the head, the intermediate metal along the shank forming projecting ribs or feathers; some have four ribs in the form of a cross, others have three, and amongst other devised forms a transverse section is shown with six ribs, another with five, and another with two, but four seems to be the number preferred. Some of the spikes are twisted in the shank, whereby the ribs are brought into a spiral form, so that whilst being driven they turn in the wood. When holes are bored it is best to plug them with pieces of wood, into which the spike is driven. The fluting of the rods is to be done by rolling during the process of manufacture.

[Printed, *6d.* Drawing.]

A.D. 1856, June 24.—N° 1484.

BOWER, Leonard.—This invention relates to a machine adapted to "the manufacture of bolts, rivets, spikes, and screw-" blanks, nuts for screws, and washers." The machine is constructed somewhat after the fashion of a steam hammer, there being an inverted cylinder containing a piston and a piston rod or ram, whereto at its lower end is affixed a hammer head, which slides in vertical guides and carries the upper die of a pair, the lower die being set directly beneath, on the upper surface of an anvil or fixed bed. Dies of various forms are employed according to the shape required to be given to the article under process.

The chief novelty of the invention consists in raising a hammer so employed by means of a vacuum, and in respect to the machine described, the vacuum is produced by exhausting the cylinder above the piston, but the manner of doing it is not explained. Steel rings encircling the dies are placed to receive the blows when the article is shaped, and thereby prevent the dies striking and injuring each other. One of a pair of cutters is fixed to the hammer head, and the other is fixed to the anvil bed; these cutters are for the purpose of severing from the rod, pieces the required length to form the article to be made. The pieces in succession are placed in the lower die, and when finished, they are thrown out by means of a pin, which is worked upwards by a lever.

[Printed, *6d.* Drawing.]

A.D. 1856, July 7.—N° 1589.

CHENOT, Alfred Louis Stanislas, and CHENOT, Eugène Charles Adrien.—This invention relates to divers machines adapted for compressing and moulding metallic sponges, dust, filings, fragments, ores, minerals, railway wheels, tires, nut-blanks for screws, and other articles. The machines operate by means of rams, plungers, or punches, which in some cases are driven slowly and gradually, and in other cases by percussion into tubes, sockets, moulds, and recesses, wherein the spongy, granulated, or fragmental metal, or other material or substance, is fed from hoppers and feeders, and by the repeated pressure or percussive effects of the operating plungers, rams, etc. becomes consolidated, and in that state is taken out of the moulds or driven out at the opposite end, the moulds or tubes in some cases contributing by their tapering form to the desired result. The operating principle in all the machines is the same, but the mechanical details and constructional arrangements differ materially; in some cases the material is compressed in a mould between two plungers or rams approaching from opposite directions, but generally a single or a series of single rams is employed with a corresponding series of moulds.

The machines are chiefly designed for receiving power from prime movers; one example exhibits a machine combined with and worked direct by a steam engine, and another by an hydraulic ram.

[Printed, 2*s*. 6*d*. Drawings.]

A.D. 1856, July 12.—N° 1647.

ADAMS, William Bridges.—This invention relates, amongst divers other matters connected with the construction of rails and the permanent way of railways, to spikes for chairs or brackets, and to a method of preventing the unscrewing of nuts or bolt heads.

Spikes for railways are made cruciform or trigonal in cross section, having three or four longitudinal feathers projecting from a small central stem; these spikes taper more or less, and the outer edges of the feathers are so fashioned, that when driven and they come to fill the diameter of the hole in the chair, they turn or curve inwards. The feathers extend the whole length of the spike, the lower ends are sharpened, and the upper ends are upset or thickened by being driven or forced into a die. Other spikes are cut out of flat bar iron and so shaped by a slanting cut, that the tapering end of one spike leaves metal to form the broadest end of another; these spikes are driven into a slot in the chair, in the direction of the grain of the sleeper.

The unscrewing of nuts and heads of bolts is prevented by the use of intermediate plates, the ends whereof are notched to the angle of the nuts, which are chamferred, that the edge of the notches on the plate may be slipt under them; when used for securing the nuts of three bolts, the plate is cut out to fit over the central nut, and the ends of the plate are notched to the angles of the two nuts on the bolts outside.

Conical collars are used on bolt ends, and screwed down by the nuts so as to fill the holes in the bracket or chair, and hook-head bolts are used in forming girder rails.

Describes a variety of railway rails, and several modes of fixing and jointing for the construction of permanent ways; these include double-headed rails, girder rails of different kinds, single-headed rails, and bridge rails, angle brackets, fishes, wedges, and modes of bolting, wedging, and fastening.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1856, July 19.—Nº 1699.

HOPPER, George.—(*Provisional protection only.*)—This invention relates to the manufacture of spikes or pins for railway sleepers. These spikes are rolled out of bars of iron by swaging-rollers, after the manner described by the inventor in his specification of a former patent which bears date June 6, 1855, No. 1292. According to the present invention, the rollers are so formed as to leave the piece of bar intended for a spike, thick at the center of its length and thin at the two ends, and also forms on one side of the piece from end to end a **V** or other shaped groove. The piece so prepared is then bent into the form of a staple and closed with the grooved side inwards, thereby forming a hollow spike, having sufficient metal at the bent end, which was the center of the bar, to form a solid head, which is made slightly coniform and finished in the ordinary way, and the ends of the two limbs or prongs are each so bevelled inwards, that when the spike is driven the prongs separate, and firmly lock themselves in the sleeper, whilst the conical form of the head prevents any lateral looseness in the chair.

[Printed, 4*d.* No Drawings.]

A.D. 1856, August 5.—N° 1842.

VASSEROT, Charles Frédéric.—(*A communication from Nicolas Marchal and Auguste Oger.*)—(*Provisional protection only.*)—This invention relates to a machine for cutting or shaping the sides of several screw nuts or polygonal pieces at one operation, and also by the same machine, tapping or worming nuts, and cutting screw-threads on bolts or pins. Fixed to the frame of the machine is a horizontal plate, whereon is radially mounted at uniform distances a number of spindles, their contiguous ends, which carry the cutting tools, all pointing to a common centre, and corresponding in number with the number of sides to be formed on the nuts or pieces. Upon each of these spindles is fixed a bevelled tooth-wheel, and all these wheels, by engaging with one revolving crown wheel, set all the spindles and cutters in motion. The nuts or pieces are closely packed on a central vertical spindle which has an ascending motion, provision being made for keeping the spindle in a central position, notwithstanding the varying lateral pressure of the cutters.

A different arrangement of the operating parts is required when nuts and screws are to be threaded or screws turned, and further modifications are necessary when cutting such nuts as are required by small manufacturers.

[Printed, 4*d*. No Drawings.]

A.D. 1856, August 18.—N° 1925.

NEWTON, William Edward.—(*A communication.*)—This is an invention of apparatus adapted for cutting and finishing metal screws. It consists, in the addition to a lathe of a slide-rest, having a sliding cutter tool mounted thereon in combination with a hollow box, into the axis of which the wire used for forming screws is inserted, and held thereby whilst the screw blank is formed out of the end of the wire by the cutting tool. When the blank is formed, the cutter slide is withdrawn by a lever, and the thread is then cut on the blank by a pair of "snap dies," which act in their turn in combination with the other operating parts of the apparatus. Each finished screw is cut off by the cutter whilst the next in succession is being formed.

[Printed, 8*d*. Drawing.]

A.D. 1856, September 13.—Nº 2143.

WHITTLE, William.—This invention, which relates to rolling nail rods to a varying thickness for the manufacture of nails, and to making and finishing the nails cut from rods so rolled, consists—

1st. Of a pair of rolls mounted in a suitable frame; around one roller there is a projecting narrow belt or collar which, as the rollers work together, fits into a groove circumferentially formed round the other roller. The periphery of the collar is so cut away as to form a regular series of segmental inclines, and when the heated rod is introduced into the groove of the other roller, it is so squeezed by the periphery of the belt, that it obtains the form of a series of wedges or nails joined head and point in succession together.

2nd. Relates to a machine which cuts up the rolled rods into separate pieces, severally compresses them, and upon each forms a head. The first part of the process is performed by two vertical and two horizontal dies, which in succession cut the pieces from the rod, compress them to shape the shanks, and hold them during the heading operation, which is performed by a die that approaches in the direction of the axis of the shank. When the head is formed, and the heading die retires, the top vertical die rises, and the horizontal dies first move sideways, and then open, and, having discharged the finished nail, return into position for the next operation.

[Printed, 1*s*. Drawings.]

A.D. 1856, October 1.—Nº 2292.

FLINT, George, WOOD, Thomas, and WOOD, Edward.—This invention relates to the construction of a punching and cutting press, adapted for stamping, coining, rivetting, slotting, cutting hexagonal nuts out of bar iron, and other purposes, the power being exerted direct upon the cutting tool by an eccentric, instead of, as heretofore, by levers. When the press is arranged for the combined operations of cutting and punching, the upper shear is fixed to the upper part of the frame, and the punch die is placed at a sufficient distance on the base frame in a vertical line beneath, the intermediate space being occupied by a projecting part of the frame, that carries a bearing for the shaft of the eccentric, which is intermediately placed, the frame forming above and below the latter two vertical guides, which receive the two sliding pieces, respectively carrying the lower shear cutter and the punch. These two sliding pieces or holders are linked together the lower end of the cutter holder resting directly upon the periphery of the eccentric, and the upper end of the punch holder being directly in frictional contact with it, in a vertical line beneath. The press is actuated either by power or by hand, the first motion coming through a fly-wheel shaft that carries a pinion which engages with a spur wheel on a counter shaft; this shaft also carries a pinion, which, by gearing into a spur wheel on the eccentric shaft, imparts slow rotary mótion to the eccentric, and thereby vertical action to the operating parts of the press.

[Printed, 10*d*. Drawing.]

A.D. 1856, November 17.—N° 2717.

BLANCHON, ESTEVES.—(*A communication.*)—This invention relates to apparatus for marking and boring leather and other materials, and to making and cutting the screw pins employed for uniting such materials, the process of pegging soles to boots and shoes being the chief end of the invention.

Three kinds of apparatus are described. The first by means of a hand lever, and a ratchet wheel marks the points where the holes are to be made. The second, by means of a revolving awl, bores a hole at every marked point. The third apparatus cuts a screw thread on wire or other soft metal, screws the threaded wire into the materials to be united, and cuts it off flush, or nearly so, with the surface. The operation is described as follows :—" A length of brass, copper, or other suitable wire is " placed in one end of a slotted tube, at the opposite end of " which are fixed screw dies at right angles to the length of the " tube. The end of the wire is introduced between the dies, the " slotted tube is caused to rotate, and carries with it the wire " upon which the dies cut a thread, draw and drive it forward, " and screw it into the leather or other substances held at the end " of the apparatus a short distance from the front of the dies. " When the screw peg has been driven home the attendant depresses a pedal, which brings together a pair of nipping levers, " which cut off the peg flush, or as flush as need be with the " surface of the outer substance united."

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1856, November 22.—Nº 2772.

HALL, William Kemble.—(*Provisional protection only.*)—This invention which relates to machinery for cutting, punching, and shaping metals, is specially adapted to the manufacture of nuts for screws, avoiding the waste which occurs when hexagonal nuts are cut from straight bars, or the expense of rolling bars with serrated or notched edges. The process consists in "cutting " from the bar only the quantity of metal necessary to form the " nut, and compressing it into the shape required by means of " dies or a variable matrix, in addition to the ordinary punches. " The movements of the dies and punches are obtained by cams " or eccentrics, with their pressure and action regulated by " weighted levers, and they are so combined that the blanks cut " from the bar or plate are uniform in size, involve the entire " material, and finish the nut into shape without fracture or " straining its texture. The size of the finished nuts may be so " proportioned to the blanks that they may be made of any " desirable degree of hardness and strength greater than the bar " from which they were formed. This arrangement of machinery " is also applicable to the manufacture, without waste of material, " of bolts, hammers, axes, and other similar articles which have " heretofore been submitted to the action of two or more sets of " dies."

[Printed, 4*d*. No Drawings.]

A.D. 1856, November 25.—Nº 2798.

NEWTON, Alfred Vincent.—(*A communication.*)—This invention relates to a machine for forging iron, which machine operates by means of four hammers acting alternately in two pairs, each pair striking simultaneously at opposite sides of a common centre, which is occupied by the forging or piece of metal under operation. The hammers are carried by shanks or levers, one pair acting on a vertical, and the other at right angles therewith, on a horizontal plane. The hammers work in four slotted guides, which are formed in the frame relatively at right angles; a central cam fixed on a shaft which points to a common centre, operates alternately on the shanks of each pair of hammers pushing each pair by turns apart after the blows are delivered, the hammers being thrown forward to strike by the reaction of springs.

When the machine is employed to forge nails, the hammer faces of each pair are recessed according to the required form, and a cutting-off apparatus is added to the machine.

[Printed, 10*d*. Drawing.]

A.D. 1856, November 26.—N° 2805. (* *)

NEWTON, ALFRED VINCENT.—(*A communication from Joseph Poleux.*)—" An improvement in the process of coating iron bolts, " bars, sheets, spikes, nails, and other articles of iron with " metallic alloys, for the prevention of rusting or oxydation." The articles are prepared by cleansing them in acid (by preference muriatic), which is used undiluted. Spelter is placed in the acid with the articles (about a pound of spelter with half a ton of iron spikes or bolts), the acid seizes on the spelter and dissolves it, and rapidly deposits it in a thin film on the surface of the iron as soon as it is cleaned, and it is thereby protected. Articles not unusually rusty, are cleansed in about a minute. After being taken out they are without further treatment passed immediately into the bath of melted alloy with which they are to be coated.

[Printed, 4*d*. No Drawings.]

A.D. 1856, December 2.—N° 2860. (* *)

THWAITES, JOHN HALL BROCK. — (*Provisional protection only.*)—" An improved screw bolt or fastening for ship-building " and other purposes." The improved fastening " combines the " properties of a nail or bolt and of a screw, being driven into the " material by percussion, like a nail, and rotating on its axis " during its advance, like a screw. These screw bolts or fasten- " ings are formed of one or more threads, the pitch of the threads " being greater than the diameter of the bolt. The form of the " threads, as also of the heads and points of the fastenings, may " be varied to suit the purposes for which they are intended, and " the fastenings may be made of various materials, as metal, " wood, ivory, &c., according to the uses to which they are to be " applied.

[Printed, 4*d*. No Drawings.]

A.D. 1856, December 6.—N° 2896.

SCHIELE, CHRISTIAN. — This is an invention of apparatus adapted for tapping nuts, cutting screws, and bolts, and forming the teeth of wheels.

1st. The tapping of nuts is effected by means of a tapered tap of considerable length, formed upon a long plain stem. This tap is placed in a vertical position in the apparatus, and is caused to revolve by any ordinary appliances, the upper threaded or cutting part being inclosed by a tube of sufficient size to admit of the nuts passing down freely. As the nuts are fed in at the top of the tube, the tap enters them in succession and draws them down, tapping them at the same time. When they arrive at the bottom of the tap, they slip down and accumulate upon the plain stem until it is filled, when the catch which causes the tap to revolve is thrown out of gear. The operating part of the apparatus is lubricated by means of a pump, which is constantly raising and delivering oil, soap water, or other lubricant into the top of the tube, thereby to prevent the heating and softening of the tap.

2nd. In cutting screws or bolts, two or four circular revolving dies or frictional cutters are employed to operate upon the opposite sides of the bolt or screw. The axes of these dies are disposed relatively at right angles on a horizontal circular frame, which rests upon a safety friction clutch or coupling, and the dies have bevelled teeth on their outer edges, so that they gear together and move simultaneously. The bolt to be threaded works down centrally between the dies as the thread is cut, and the operating parts are kept constantly lubricated by a pump.

Describes the process employed for cutting the dies.

3rd. Relates to cutting the teeth of worm and other wheels by revolving "worm like cutters" shaped to correspond with the desired form of the teeth. These apparatus are fully described and illustrated.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1856, December 13.—N° 2962.

JOHNSON, CHARLES.—(*Provisional protection not allowed.*)—This invention relates to fastenings for timber to be used in the building of houses, ships, and carriages, and for all other kinds of wood-work and building purposes. These fastenings consist of "self-clinching split nails, screws, spikes, bolts or brads, made "of iron, steel, and other metal, covered or coated with copper, the process for doing which is not described.

[Printed, 4*d*. No Drawings.]

A.D. 1856, December 20.—N° 3018.

NEWBURY, Thompson. — (*Letters Patent void for want of final Specification.*) — This invention relates to a machine for forming the threads on screw blanks. The blanks are held by a feed pan or hopper, and severally fed into the machine through guides by an elevator, which works upwards through a slot in the bottom of the hopper. The blanks in succession are received by a carrier, which delivers them to a pair of nippers, whereby they are severally held during the operation of the pointing and threading tool; the tool holder moves in the direction of the length of the blank whilst the pointing is performed, being brought into and thrown out of operation by a lever, which is actuated at the proper moment by a cam. The threading is effected by the same tool, an independent movement being communicated to the tool holder by means of a "leader worm," which at proper intervals gives by means of a ratchet wheel and pawl, lateral motion to the shaft whereto the tool holder is attached. After the tool is withdrawn the finished screw falls from the nippers.

[Printed, 4*d*. No Drawings.]

A.D. 1856, December 24.—N° 3058.

ELLIOTT, John.—(*Provisional protection only.*)—This invention relates to machinery for manufacturing rivets, bolts, spikes, and similar articles from rods or bars by a rolling process. The rod taken in a heated state from the furnace, which is conveniently placed, is cut up into lengths suited to the special article about to be made, the transverse form and size of the rod, corresponding with the desired form of the head. The shanks of these pieces are operated upon by a heavy roller, which revolves on its axis in bearings supported by a suitable frame, the lower part of the roller being inclosed by a fixed concave casing or bed, so disposed eccentric to the periphery of the roller, that the small annular space which is formed between the roller and the bed, diminishes gradually from one side, where the blanks are introduced, to the other side where they exit. A small portion of the periphery at each end of the roller is cut away or recessed sufficiently to leave that portion of the blanks which is to form the head free from pressure. Two blanks at a time are fed into the apparatus one at each side, and as they roll through the diminishing space, the shanks are compressed and drawn out to the required size.

[Printed, 4*d*. No Drawings.]

1857.

A.D. 1857, January 15.—N° 126.

WATKINS, Francis.—The object of this invention is improvements in machinery for manufacturing from metal rods or bars taken at a bright red heat, bolts, spikes, and rivets. It "consists " of a peculiar combination of mechanism for receiving and hold- " ing a rod or bar between clamping dies, at the back of which " are placed blocks or springs of vulcanized india-rubber, enclosed " in suitable boxes or cases, so as to confine such blocks or springs " of india-rubber and yet allow of their offering some elasticity " to the clamping dies, which is requisite in order to suit them " for holding rods or bars of somewhat different sizes. Each rod " or bar has a head formed on the end, introduced through the " holding or clamping dies by a suitable header, carried by a " slide, actuated by a cam, there being a similar block or spring " of vulcanized india-rubber, as above explained, introduced " between the parts acted on by the cam and the heading die. " The clamping or holding dies are carried by sliding plates, " which are actuated by cams suitably formed to press these dies " towards each other (when the end of a rod or bar has been " introduced) and for a time to hold the bar or rod in position to " have a head formed thereon, then to open the holder or clamp- " ing dies, to release the bar or rod, in order that the headed end " of the bar or rod may be removed from between the clamping " dies, and also to admit of another bar or rod being introduced " between the clamping or holding dies before they are again " closed. The rods or bars after they have had heads formed " thereon at one end are taken to shears, so that a proper length " for a bolt, spike, or rivet may be cut therefrom, when the rods " or bars again have heads formed thereon, and are again cut. " The heading die or die box is arranged to be capable of adjust- " ment, in order that from time to time the same heading die or

" die box may be used in making different sizes of heads on the " rods or bars introduced into the machine."

[Printed, 1s. Drawing.]

A.D. 1857, January 22.—N° 187.

BOWER, Leonard.—(*Provisional protection only.*)—This invention relates to machinery adapted for forging bolts, rivets, spikes, screw-blanks, nuts, and washers, by the use of hammer dies and stamps attached to the underside of a gravitating heavy block, the companion dies being correspondingly adjusted on the machine bed beneath. The dies are selected to mould the article to the desired form, each description of bolt, spike, or rivet, requiring a change of dies. The hammer block or weight is to be raised by any convenient means to a suitable height, according to the force of the blow required; when disengaged it falls, the necessary effect upon the metal placed between the dies being produced by its own gravity alone.

[Printed, 4d. No Drawings.]

A.D. 1857, January 26.—N° 225.

HAILE, John.—(*Provisional protection only.*)—This invention which relates to the manufacture of nails, is more particularly applicable to the machinery described by G. T. Bousfield, in the specification of a patent granted to him, bearing date May 15, 1855, No. 1099. In the said machinery gripping dies are employed in combination with movable cutters, the nail blanks being pushed out endwise to receive the heading operation. According to the present invention it is proposed to simplify the machine by dispensing with all the parts employed for pushing out the nail blank towards the header, and instead thereof raise the blank into a groove in the top shear, and cause the removal of the bed shear. " The blank is then gripped between the top shear and the upper " and lower gripping dies, one gripping die being advanced " towards the top shear to form the nail, and afterwards receding " to allow the nail to drop. The top shear has a groove or matrix " of the form of the nail sunk in that edge, which will meet the " two gripping dies, these gripping dies forming the third and " fourth sides of the matrix. The matrix, as above described, is " cut out of the solid top shear. Should it be preferred, I can " make a separate die to form the upper side of the nail, and

" attach it either to the frame of the machine or to the top shear, " avoiding the labour of cutting the solid."

[Printed, 4*d*. No Drawings.]

A.D. 1857, January 27.—N° 239.

DOELLING, George Léonard.—The object of this invention is an improved apparatus for cutting screw threads, consisting of a hand stock furnished with four cutting dies. These dies are fitted to slide respectively in four grooves, radiating relatively at right angles from the centre of the die holder. The latter is a flat circular box, with one handle fixed projecting from its periphery. The other handle is attached to a circular plate, which fits to the interior of the box, and has cut through it four paracentric slots, which respectively receive four ribs, severally projecting, one from each die. The other handle is attached projectingly to this plate, and its position is regulated by a set screw threaded into a piece attached to the die box. By this means when the handle is moved in either direction, the dies are correspondingly set either nearer or farther from the centre, so as to accommodate and operate upon rods or blanks of different sizes, a fresh set of dies being necessary only when a change in the pitch of the thread is required.

A modification of the apparatus, having one handle and an arrangement of dies in a square box, is described.

[Printed, 10*d*. Drawings.]

A.D. 1857, February 3—N° 316.

BERNARD, Julian.—This invention relates to apparatus for making double pointed nails or fastenings, to be employed for uniting two surfaces of wood, metal, cloth, leather, or other material. These fastenings have the appearance of two tacks or round-headed nails joined head to head together, and when in use they are unseen, being placed between the surfaces of the two materials which they unite, one point entering one surface, and the other point the other surface, the two parts or materials being forced together. Instead of a central projecting collar, the two ends of the fastening may be of different diameters, so as to form a square shoulder about the mid length, where they meet, and nails may have lateral projections pointing from the mid length.

The fastenings may be made by passing wire between rollers, such rollers having peripheries suitably fashioned with curved inclines and cavities, to form the two points and the intermediate shoulder or projecting collar, and they may be produced from sheet metal, first cut into strips corresponding to the length of the fastening, and afterwards cut from the strips and finished by the combined action of rollers and dies, the invention not being confined to any particular mode of producing them.

[Printed, 6*d*. Drawing.]

A.D. 1857, February 10.—N° 378.

STOKES, Abel.—This invention, relating to the heading of pins and spikes, consists of a pair of die holders, designed for so holding pins and spikes during the heading process, that no injury can happen to the points, the two dies being held to receive the pin or spike in nearly a closed position by a bow spring. Within the cavity of the dies near the bottom there is a small plug supported by a spiral spring, and in the top of this plug, which acts as a cushion, there is a recess into which the point of the pin or spike falls. The upper part of the cavity in the dies is countersunk or recessed to the required size of the head, and the pin or spike is held by a contraction in the cavity of the dies just below the recess, whilst the head is formed by any of the usual appliances in use for that purpose. These pins and spikes are afterwards intended generally to have brass heads cast on the heads formed in the dies, although they may be used without. After the brass heads are cast on, they are trimmed and finished by suitable apparatus, actuated by steam power or otherwise.

[Printed, 6*d*. Drawing.]

A.D. 1857, February 16.—N° 448.

NEWTON, William Edward.—(*A communication.*)—This invention relates to the dies used in machines employed for forging and moulding wrought iron and other metal nuts, washers, and similar articles. These dies are made of iron cast in chills; those described consist of three parts or pieces, but more or less may be desirable, according to the nature of the work. "The upper " die works in a die box, and on the top of the die is placed a " check plate, through which and the die passes a punch. The " die box is placed inside a metallic ring, which ring strengthens " it, and it is attached to a crosshead by any of the ordinary " means."

"The die-box and punch are so secured to the crosshead that they move simultaneously, while the check plate and die move independently to the extent of throwing the nut or other article out of the die-box when the crosshead ascends; and as the crosshead descends, and the nut is being cut off from the heated bar and swedged into shape, the die and check plate raises the thickness of the nut. The lower die is so secured in place that it will be in line with the chamber of the die-box, and with the punch which enters the lower die when perforating the hot blank. In making hot-pressed nuts and washers the heated bar is placed upon the lower die; then by the descent of the crosshead, the blank is cut off from the bar by the die block, and swedged and compressed into shape in the chamber of the die; at the same time the blank is punched by the central punch, and the burr from the nut passes off through a hole in the lower die to the ground. As the crosshead returns, the check plate is brought in contact with a check bar on each side of the machine, and stops the check plate and the upper die, and forces the nut out of the chamber. In the upper dies are grooves to allow the passage of water to cool the punch, as may be required, which may be done during the interval of heating the bar when the machine is at rest."

[Printed, 8*d*. Drawing.]

A.D. 1857, February 16.—N° 450.

NEWCOMB, Thomas.—This invention has for its object improvements in the manufacture of nails, which may be cut either from rods the required size or from plates the proper thickness.

"The machinery is arranged, first, to cut off a proper length or portion of metal which has parallel sides, and in order to forge or press such sides to make them taper or come to a point, the portion of metal passes between two rollers, one of which is placed eccentrically on its axis, or it may be fixed concentrically, and its axis have a motion to and fro. The other roller is placed concentrically on its axis, and it has two projecting flanches, between which the circumference of the eccentric roller works. The piece of metal is caused by the working of the machine to be fed between the two rollers when their outer edges or peripheries are at the greatest distance apart, and as the rollers rotate, they (by reason of their peripheries coming more

" and more nearly together) cause the metal to be pressed more " and more on two of its sides. As the piece of metal passes " from between the pair of rollers, it comes against a fixed die, " between which and a moveable die (moved into position by an " eccentric so as to come in contact with the piece of metal at the " moment the pointed end leaves the pinch of the rollers), the " piece of metal is held, whilst the heading die (acted on by a " cam) causes the head to be produced; the pointing or forging " rollers continue their rotation, another piece of metal is cut off " and is fed in by the working of the machine, the holding dies " open, the header goes away, and the finished nail then drops " out. The metal may be worked hot or cold, according to the " size and nature of the nails which are to be made."

A modified form of machine, adapted to make the larger sizes of nails, is described and illustrated.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1857, February 16.—N° 453.

PARKES, ALEXANDER.—This invention, relating to the manufacture of nails, " consists in making cup or hollow-headed nails " of wrought iron or other wrought metal " discs cut to " the size " and thickness of the head of the nail I require, and the shank " is also to be cut out separately from the head; and to unite the " head and shank, I cause the shank to be placed in suitable " tools or dies, and the discs to form the head are pierced in the " centre with a hole through, or partially through, suitable to the " size of the shoulder on the shank, and are to be placed in suitable tools, and brought on to the shanks; and whether presses " or stamp machinery are used, the two are forced together, when " the head and shank will be firmly united into a nail; the top " and bottom dies will cause the head to assume the domed shape " required, or I dome the pieces to form the heads in separate " tools before I unite the heads to the shanks. The nails, when " made as above, may be coated with tin, brass, or other metal, by " any of the well-known methods employed for coating metals, " or the nails may be blacked or bronzed. I also make ornamental heads to the nails, if required. In place of the heads " being circular, the piece for the heads may be cut to other forms, ' using tools of the required design."

[Printed, 4*d*. No Drawings.]

A.D. 1857, March 2.—N° 598.

MURPHY, James.—The object of this invention is the so securing or locking screw-nuts on their bolts, and bolts that are screwed into plates, that however much such nuts and bolts are subjected to concussion, they hold fast, and cannot become unscrewed. This result is effected by longitudinally cutting grooves along the screwed part of the bolts, so as to cut across the threads, and in the case of nuts, cutting the grooves internally across the threads from face to back, and then into such grooves when the bolts or nuts are tightened up, fitting and driving small keys, or tapping such grooves and fitting therein small wire screws.

[Printed, 6*d*. Drawing.]

A.D. 1857, March 9.—N° 687.

NEWTON, William Edward.—(*A communication.*)—This invention relates to apparatus for cutting screw-threads, and consists chiefly in the arrangement of the die chuck, whereby, by means of opening, closing, and adjusting one set of dies, screws of different sizes may be cut. The die chuck comprises a flat circular box, internally provided with three grooves severally radiating trigonally from the centre. In these grooves three dies are fitted to slide radially, and by means of links, which severally connect each die to a circular plate, they are simultaneously caused to move from and to the centre, and so close upon the screw. The chuck is mounted in a gimbal or frame, so that the dies accommodate themselves to any inequalities in the screw blank, which is held by the nose of a mandril, mounted in a headstock similar to a turning lathe. Different sets of dies are required for every change in the pitch of the screw-threads, but each set will cut different-sized screws.

[Printed, 8*d*. Drawing.]

A.D. 1857, April 3.—N° 927.

BROOMAN, Richard Archibald.—(*A communication.*)—This invention, relating to a machine for making bolts and rivets, operates by means of an intermittently revolving die holder, which is furnished with four dies or matrices, and is mounted on a horizontal shaft. As the die holder revolves, the dies in rotation are brought coincident first with a cutting tool, which severs the piece from the end of the heated rod and leaves it in the die; the next movement of the holder carries the loaded die round a quarter of a revolution, stopping directly opposite the heading tool, which advances and moulds the head of the rivet, resistance to its pressure being afforded to the point of the rivet, by the end of an adjustable screw. The next movement of the die holder brings the finished rivet or bolt opposite a clearing pin, which advancing, pushes it out of the die. In this way the three operations of cutting off, heading, and clearing, are carried on simultaneously, a finished bolt or rivet being pushed out every successive movement of the die holder.

[Printed, 8*d*. Drawing.]

A.D. 1857, April 11.—N° 1017.

MARROW, James.—(*Provisional protection only.*)—This invention relates to the construction of a machine adapted for forging bolts, rivets, nuts, and similar articles. This machine operates by means of a number of hammers, which act as top swages, dies, or cutting tools, to a corresponding number, disposed in position in cavities, formed to receive them on the upper face of an anvil. The ends of the hammer shanks center on pivots held by the back frame. The shanks about their midlength are attached to a series of connecting rods, which severally extend downwards, and are jointed to a corresponding series of levers, operated by a series of cams or tappet wheels mounted on a revolving shaft. After each blow the hammers are raised by vulcanized india-rubber springs, respectively attached at one end to the hammer shank, and to the upper frame of the machine at the other. The hammers by means of foot plates are brought into activity by the workman as required, and when not operating remain suspended by the springs.

[Printed, 4*d*. No Drawings.]

A.D. 1857, May 9.—N° 1313.

WATKINS, Francis.—(*A communication.*) — "This invention "has for its object improvements in machinery for making rivets, "bolts, and spikes. For these purposes two wheels are used, the "peripheries of which are formed into segments with flat surfaces.

" In these segments the arms of the dies are formed in such " manner, that when a flat segment of one wheel is opposite a " flat segment of the other wheel, and the two are pressed " together, they form a die suitable for making a rivet, bolt, or " spike, as the case may be. These wheels are geared together " by toothed wheels, the teeth of which admit of the peripheries " of the die wheels coming up to and departing from each other, " so that the two die wheels may be revolved at intervals a distance suitable for bringing the next sections of the two wheels " into a position to be pressed towards each other. The die " wheels are made to rotate a distance at intervals by means of " a suitable ratchet wheel and driver. In combination with these " die wheels is a gauge plate, to determine the distance to which " the rod or piece of metal shall be introduced, also a cutter and " a header. The die wheels are pressed towards each other at the " proper intervals by suitable cam surfaces, and the gauge, plate, " cutter, and header are actuated by suitable cam surfaces and " instruments moved by the working of the machine."

The rivets and articles are made in succession from a number of rods, the ends of which are heated in a furnace, and taken in rotation, are placed in the die box sections.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1857, May 19.—N° 1406.

HOPE, JOHN.—(*Provisional protection only.*) — This invention relates to the manufacture of screw-nuts, and to a ratchet brace for working them.

These screw-nuts are externally cylindrical in form, and may be either plain or grooved, or fluted in lines parallel with the axis. " The ratchet brace consists of a lever with forked ends or jaws, " in one or both of which is fitted a moveable tongue to clasp " the nuts and turn them as required. These nuts and braces " will be especially useful where there is not sufficient space to " allow of much play of the lever."

[Printed, 4*d*. No Drawings.]

A.D. 1857, May 23.—N° 1453.

CARRON, WILLIAM.—This invention consists, either by a rolling, a forging, or a cutting process, in making nails, spikes, and bolts, which, in transverse section, resemble more or less an equilateral triangle. It is stated, that such nails when driven into wood, hold with greater tenacity than the ordinary nail, and do not tear or fracture the wood to the same extent, and that the invention is applicable to every kind of nail, spike, and bolts or pins for railway and other purposes.

In the rolling process, three rollers are employed, with peripheries so shaped that, when they are in contact, they mutually form between them a triangular opening for the passage of the heated rod. This passage contracts at regular intervals to taper and shape the points, and forms cavities to produce the heads, the rollers being made to revolve at a uniform speed by means of gearing, each roller forming one side of the nail or spike.

The forging of these nails is effected by means of an anvil furnished with a series of triangular grooves, varying in size to suit different classes of nails, spikes, or bolts, the heads being made in the usual way.

When such nails are produced by a cutting process, an ordinary nail cutting machine is employed, the cutters operating at such an inclining angle, as to produce two sides of the triangular form of the nail, the top and bottom surfaces of the plate alternately forming the third.

The sides of these nails may be either flat, concave, or convex.

[Printed, 8*d*. Drawing.]

A.D. 1857, May 27.—N° 1503.

JOSSA, Ferdinand.—(*Provisional protection only*.)—This invention relates to the construction of machinery for working, by compressed air and by vacuum, hammers adapted amongst other purposes to the forging of nails.

"The machinery consists of a bored cylinder, closed at the top " and open at the bottom, in which a portion is fitted air-tight of " a piston-rod carrying the hammer, which strikes on an anvil. " About two inches below the cover of the cylinder a two-inch " pipe enters, which is connected by a curve upwards in the pipe " with a metal chamber four feet in diameter, and ten feet long, " having hemispherical ends; the bottom of the pipe has an open " mouthpiece; a junction pipe is bored, and contains a piston " fitted air-tight. In connection with the metal chamber or " receiver is an air machine, which resembles cylindrical bellows, " differing from them only that the valves open (opposite to each " other) in opposite directions; this air machine (or air pump) " may be worked by a water wheel or steam power, and produces

" in the receiver a vacuum. By pressing down a lever the piston " is also moved downwards, the air rushes from the cylinder into " the exhausted receiver, which is two hundred times larger than " the cylinder of the hammer, and the hammer is then raised by " atmospheric pressure; the pipe from the receiver ending two " inches below the cover, the piston cannot reach the latter, " because air which is there compressed sends the hammer back " to the pipe. When required the lever is let go, or moved " upwards, the air enters immediately into the cylinder again, " and effects a falling of the hammer."

"By means of the lever both the number and height of the " strokes may be regulated, the lever continuing in a midway " position, the connection with the receiver, as well as the accession of air to the cylinder is stopped, and the hammer remains " stationary. Through the raising of the lever the hammer may " be raised its whole height, or may be dropped from any desired " height; if a regular working of the hammer be required, the " lever may be moved by means of an eccentric driven by steam " or water power."

[Printed, 4*d*. No Drawings.]

A.D. 1857, June 17.—Nº 1699.

NEWTON, Alfred Vincent. — (*A communication.*) — The object of this invention, which relates to machinery for forging nails and other articles, is to operate upon the metal used for the forging by a succession of blows, delivered by two hammers alternately striking, one on the top of the article, and the other at the side, resistance being afforded by two moving anvil faces, fixed radially at suitable angles in a segmental recess formed in a heavy rocking shaft, which brings them alternately into position, one with its face horizontally beneath the article, and the other vertically at the side opposite the hammer which strikes horizontally, thereby obviating the necessity for turning the nail or article between each successive blow, the forging being effected between the hammers and anvils respectively, and each successive blow is struck by the hammers alternately whilst the anvils are momentarily at rest.

After the shank of a nail has been formed by the co-operative action of the hammers and anvils, the feeder with the rod is drawn back until it is stopped by a gauge pin, when the forged end and a small portion of the rod sufficient to form a nail head, is severed from the rod by a pair of cutters.

[Printed, 8*d*. Drawing.]

A.D. 1857, June 22.—Nº 1741.

NORRIS, JOHN, junior, and WORSTENHOLM, GEORGE.—This invention relates to the manufacture of nails, bolts, spikes, screws, rivets, and screw-blanks, from bars, rods, or strips of metal. The machine has two sets of operating apparatus, respectively on the opposite sides, so that it is capable of making nails from two rods at the same time. The chief movements are effected by cams mounted on a central shaft, which carries the driving pulleys. The nail rod at each side of the machine is fed under a roller and ratchet, and passing through the feed box is kept in position by a spring until it enters a guide; it is then met and pressed by a movable die against a fixed die, which dies are suitably grooved for giving to the end of the rod the required form for a nail shank. The length thus formed, is then cut off by the edge of the guide, the shank the while being gripped between the dies. The heading tool is then advanced simultaneous with the withdrawal of the feed apparatus, and the head is formed out of a portion of the rod which is left by the cutter projecting from the dies. The parts then relax for the next operation, and the finished nail drops from the machine. The dies may be modified so as to operate alternately on two rods, by using two fixed dies and one reciprocating intermediate duplex die, carrying at its two sides the companion dies to those which are fixed, two heading tools and two sets of feeding apparatus being then required.

[Printed, 10*d*. Drawings.]

A.D. 1857, June 24.—Nº 1766. (* *)

PARKES, ALEXANDER.—(*Provisional protection only.*)—" Im-
" provements in coating metals with other metals."
" This invention has for its object improvements in coating
" metals with other metals. For this purpoze zinc in a granu-
" lated or divided state, or other metal positive to the metal to be
" coated, is added to the coating solution, which may be pre-
" pared as if it were to be used for depositing metals with a
" galvanic battery in the ordinary way of electro-deposition. The
" article to be coated is immersed and moved about rapidly in the

" solution in contact with the zinc or other metal until a coating " of sufficient thickness is obtained. This process is particularly " applicable to coating small articles, such as pins, nails, or " screws, which cannot conveniently be coated by the use of a " battery."

[Printed, 4*d*. No Drawings.]

A.D. 1857, June 25.—Nº 1777.

PITMAN, JOHN TALBOT.—(*A communication.*)—This is an invention of a machine adapted to the manufacture of wood screws, comprising a combination of apparatus for acting in rotation, respectively performing the progressive operations of feeding, pointing, and threading screw-blanks. Employed for feeding the blanks is "a jointed segmental elevator, vibrating through a slot " in the bottom of the feed pan or hopper in which the blanks " are held. This elevator when down even with the bottom of the " pan receives the blanks, and when rising delivers them into " fixed ways or guides, whence they descend to a carrier, which is " vibrated from a vertical to a horizontal position by means of an " arm operated by a cam, and controlled in its movements by a " curved slotted guide piece. The carrier, when in the horizontal " position delivers the blank to the nippers, which hold it while " it is being pointed and threaded, both which operations are " performed by the same tool. During the pointing the tool or " cutter is moved lengthwise of the blank by means of a cam " actuating a lever which moves the tool holder. The tool is " brought toward and from the blank by means of projections or " risers on a cam wheel operating the arm or lever to which the " tool is attached. The motion of the tool in threading the blank " is independent of the pointing motion, being communicated to " the tool by means of a leader worm, which at proper intervals " gives lateral motion to the shaft to which the tool holder is " attached by means of a catch wheel and spring paul operated " by a spring and chain. When the threading is completed, the " lower end of the arm or lever to which the tool is attached falls " into a recess in the cam wheel, thereby withdrawing the tool out " of the way, so that the screw may be dropped from the nippers " by any usual mode."

[Printed, 8*d*. Drawing.]

A.D. 1857, June 26.—N° 1799.

WATKINS, Francis.—(*A communication from Richard H. Cole.*) —(*Provisional protection only.*)—This invention relates to the manufacture of screw nuts. "In place of forming the metal as "heretofore, the end of the heated metal bar is first shaped im"mediately in front of the mouth of the die box, so as to corre"spond on all sides but one with the construction of the finishing "die box, by which the necessity of cutting off by the punch of "more than one side of the nut to be formed is prevented, by "which there is not only a saving in metal, but the power required "for such manufacture is reduced."

[Printed, 4*d*. No Drawings.]

A.D. 1857, July 7.—N° 1882.

FONTAINEMOREAU, Peter Armand le Comte de.—(*A communication.*)—This is an invention of apparatus for making and applying screw-rivets, adapted for uniting leathers or materials forming boots and shoes, pipes, buckets, driving straps, and similar articles. The apparatus comprises a suitable frame or table, whereon is fixed an upright pillar standard for supporting an adjustable slide block, which carries the fulcrum of a balance lever. One end of this lever is connected to a treadle and carries a balance weight, the other or shorter end carrying the operating apparatus. By means of the treadle, the end of the lever is raised or lowered for the purpose of pressing the screwed wire into the leather or material. The wire for forming the screws passing downwards, is guided internally through a tubular screw and brought into contact with a threading tool, which is advanced by a lever, the wire being caused to revolve. The threaded end of the wire then being pressed upon the shoe sole or material, it screws itself in until it comes in contact with the iron last, when the "ends are pressed down and form with the screw thread a rivet "by the pressure of the tool" the wire being "cut of a triangular "shape." A cutting chisel is then advanced by a lever, and severs from the rod the end which has entered the sole.

[Printed, 10*d*. Drawing.]

A.D. 1857, July 21.—N° 2012.

NEWTON, William Edward.—(*A communication.*)—This invention relating to the process of making screws and screw-caps from thin sheet metal, consists in chasing or compressing the metal upon a rotating mandril or chuck, screw threaded and mounted in an ordinary turning lathe.

" To make a screw cap, a disc of thin sheet metal is placed con-" centrically between the chuck and the follower, and held firmly " in position by pressure applied to the follower by forcing up " the centre against it. The lathe is then put in motion, and of " course, rotates the metal disc, against which, while rotating, a " dull tool is pressed, in such a manner as to force the projecting " portion of the disc over upon the periphery of the chuck, so as " to form a closely fitting cap around it. The chuck has a round " threaded screw cut upon its periphery, and after the cup form " has been given to the disc, a chaser (so rounded as not to cut " or abrade the metal) is pressed against the metal, so as to force " the sides of the cup into the threaded form upon the chuck. If " a nozzle is required, the disc portion of the cup may be cut out; " but if a cap is required, the disc is retained. If required the " cup form may be given to the thin metal, which may be after-" wards placed upon the chuck, and the screw thread formed as " above, or after the cup form is given to the metal it may be " placed inside of a chuck threaded internally instead of ex-" ternally, and the thread produced in a similar manner as " already described."

[Printed, 6*d*. Drawing.]

A.D. 1857, July 30.—N 2077.

FREARSON, John.—This invention relates to various arrangements and combinations of mechanism to be employed in the process of feeding, cutting, shaping, and piercing metals, especially applicable to the manufacture of buttons, eyelets, and other similar articles.

1st. Describes a machine for making eyelets. This machine combines a variety of operations, viz., feeding the metal to and from the dies by a combined lateral and longitudinal movement; the arrangement of the cutting out motion; the blank feeding movement; the shaping movement; the piercing movement; the feeding of the articles from die to die and from the revolving cutter, and cutting the rough edges off pierced articles, in the same machine which cuts out the blanks.

2nd. Machine for making buttons composed of two or more pieces of metal. Consists of details and arrangements for cutting out and piercing the blanks; shaping, piercing, and closing the buttons in the same machine; feeding and turning the articles whilst being shifted from die to die, and the manner in which annealed sheets of metal have their surfaces raised by a succession of operations, one or two rows of punches operating across the sheet at the same time.

The mechanism described as relating to the manufacture of buttons and eyelets, with modifications is applicable to a variety of other purposes, including covering and ornamenting the heads of small nails.

[Printed, 2*s*. 2*d*. Drawings.]

A.D. 1857, August 21.—N° 2221.

LAURENT, Victor Hippolyte.—This invention relates to a forging machine, adapted to the forging of nails and small articles at one heat, thereby obtaining by machinery the same result as hand forging. To effect this, the rod of metal is taken, with its end previously heated to a white heat, and presented "to the " point of intersection of four sliding hammers placed at right " angles, and moving with a regular alternate motion, so that the " rod to be forged is hammered on its four sides without its being " necessary to submit it to an alternate rotating motion. In " order to prevent the two sets of sliding hammers from striking " or catching with each other in their motion the crank shafts " which drive them are disposed in such a way that one set is " down when the other set that moves at right angles with the " first one is up at the same moment. The striking ends of the " sliding hammers may be provided with a roller provided with a " series of stamps engraved on its surface. A ratchet wheel " fixed on the prolonged axle of the roller causes the latter to " move round a certain extent each time the slider raises up, so " that each stroke given to the rod may be struck by a new " stamp."

"A special feeding contrivance . . . . . having been supplied " by the workman with an iron rod for making a nail, the end of " which is white hot, brings it under or between the forging " stamps, which shape the stem or shank of the nail. When this " work is done the same feeder removes the rod from the stamps " and directly engages the forged stem into a perforated die which " is brought opposite to it. A cutter at this moment cuts off

" from the rod the required length which is to produce the nail, " leaving projecting out of the die a length of the rod sufficient " for making the head of the said nail. The die being thus fed " moves away and stops before a slide which punches a head to " the nail. The heading being done moves farther on and stops " before a lever, the effect of which is to force the nail out of the " die by bearing on the point which protrudes out of the said die, " when a hook seizing the nail's head pulls it out entirely. As " soon as the first rod is cut off a second rod, which has been " placed in the feeder whilst the first was being forged, is carried " in its turn between the forging stamps, where it undergoes the " same operations."

[Printed, 2*s.* Drawings.]

A.D. 1857, September 9.—N° 2352.

BACON, Joshua Butters.—(*A communication.*)—(*Provisional protection only.*)—This invention relates to machinery for manufacturing horse-shoe nails. The machine operates upon the heated metal by the pressure in rapid succession of a series of segments of rolls, fitted on vibrating centres to act in pairs, and so arranged that, in order to impart the necessary toughness to the nails, the pressure of each successive pair in the series is lateral to the preceding. Suitably arranged between each pair of segments there are feed rollers, which pass the metal pieces in succession from pair to pair of segments, the first pair at every forward movement cut off the required length for a nail, partially give it shape, and pass it on to the next, the operating faces of each successive pair being so progressively fashioned that the last pair of segments delivers a finished nail every vibratory movement of the segments, the whole series being caused to act simultaneously backwards and forwards by means of a crank, the action of which is somewhat longer than the length of a nail.

[Printed, 4*d.* No Drawings.]

A.D. 1857, September 15.—N° 2392.

ARCHER, Thomas, junior.—This invention relates to a machine for cutting off and heading lengths of metal, applicable to the manufacture of rivets and similar articles. The axis or shaft of the machine carries two driving pulleys and a fly wheel, and also for the purpose of actuating the operative parts of the machine, an eccentric for giving motion to the heading ram, and two cams. The metal rod, in either a heated or cold state according to the nature of the metal, is fed through an opening in the upper cross frame into a hole in a fixed chilled cast iron cutter plate, into contact with an adjustable stop, fixed according to the desired length of the rivet. A movable cutter and die are carried by a sliding plate, which moves first to receive the end of the rod, second to cut off the piece from the rod, which piece remains in the die whilst the head is formed by the heading punch, and third, to place the die opposite a pin which forces the rivet out of the die, and which is operated by one of the cams on the shaft, the slide with the movable cutter and die being actuated by the other cam. The parts are kept cool by a flow of water.

[Printed, 1*s.* 2*d.* Drawings.]

A.D. 1857, October 17.—Nº 2656.

BADGE, RICHARD JOHN.—This invention, relating to a mode for securing railway chairs to sleepers, is effected by means of a longitudinally divided treenail or compound fastener which, after being inserted, is caused to open by driving between its divided parts a flat parallel metal key. The treenail is divided nearly throughout its length, a short portion only of the lower end being left solid, and this part splits entirely through to the end when the key is driven down between the two parts. The end of the key, which is made longer than the treenail, projects above the latter, and is capable when required of being withdrawn by "my patent extractor." The cut which divides the treenail from the top down towards its lower end, diminishes in breadth downwards, so that when the key is driven down the bottom parts open out and in a degree become dovetailed in the sleeper.

[Printed, 6*d.* Drawing.]

A.D. 1857, October 31.—Nº 2768.

LOWE, THOMAS.—This is an invention of apparatus adapted for feeding screws, blanks, shanks, pins, and such like articles to lathes or machines employed for turning, nicking, and worming, the blanks or other articles being placed in the clamps and chucks while the latter are in motion, without the assistance of hand labour. Two modifications of the apparatus are described, one adapted for feeding small blanks, and the other more suited to feed large blanks, or articles to machines or lathes. The blanks to be fed are contained in a box, whence in succession they are caused to fall upon an incline, where they become closely packed, and gradually descend as those at the bottom of the incline are, one after another, brought into a horizontal position by the curvature of the lower end of the incline, and allowed by the action of fingers to fall into the open arms of a pair of pliers, which are first closed by the action of a wedge, and then sliding over a surface, they present the blank in a suitable position to be seized by the chucks, the pliers, after liberating the head of the blank, being pulled back by a spring.

[Printed, 8*d*. Drawing.]

A.D. 1857, November 9.—Nº 2832.

PARKES, Alexander.—This invention relates to the manufacture of nails from sheets of metal, or from copper or other metal wire rods, the diameter of which is greater than the stems of the nails made therefrom. In order to form the stems, the rods are reduced in size at close regular intervals in their length by pressure between dies, the intermediate parts intended to form the heads being left untouched, and the thin metal which squeezes out laterally from between the dies being afterwards removed. The rods are then cut up into pieces the required length, according to the marking of the dies, the heads being finished afterwards by any of the ordinary processes. Instead of using dies to reduce the rods by compression, the shanks may be formed by cutting the metal away, leaving at regular intervals pieces of the rod untouched to form the head.

When nails are made from sheets of metal, the latter are either cast or rolled with projecting ribs or enlargements, severally corresponding on both surfaces of the plate. From plates thus prepared, the nails are to be so cut by stamping or cutting, that the ribbed or thickest parts are made to supply the additional metal to form the heads. When plates of uniform thickness are used for cut nails, the heads and shanks are finished by means of suitable dies and cutters.

[Printed, 4*d*. No Drawings.]

A.D. 1857, November 12.—Nº 2852.

COLEMAN, Ebenezer.—This is an invention of a spring chuck applicable to lathes adapted for turning bolts, screw-blanks, and other small metallic articles, and so constructed that the bolts or articles may in succession be changed or discharged from the clips or jaws of the chuck without stopping the revolution of the lathe. To this end the mandril of the lathe employed is made tubular, the passage through it being rectangular at the front end. The chuck is a long bar longitudinally split from the fore end, which forms a pair of clips or jaws, to about its mid-length; it passes through the mandril, the back end forming a tail-piece which carries a spiral spring, confined between a collar fixed towards the end on the tail-piece and the back surface of the lathe head-stock. The two opposite sides of the clips fit exactly into the rectangular opening in the end of the lathe mandril, but the back of each increases in thickness, so that when, by means of a treadle which overcomes the spiral spring, the end of the tail-piece is pressed upon by a lever, the clips are caused to project from the front end of the mandril, and, springing open, the bolt or article is discharged, and they close upon the next which is placed between them, when they are forced back by the spring after the treadle is freed from the pressure of the workman's foot.

[Printed, 6*d*. Drawing.]

A.D. 1857, November 28.—N° 2968.

GRICE, Frederic Groom.—An invention of machinery for making bolts, spikes, rivets, screw-blanks, and similar articles, This machine may be termed a heading machine. The pieces of rod for forming the article under process being previously cut to the required length, and heated at one end, are placed in rotation in a circumposed series of dies, which are respectively fitted in the upper surface of a horizontal intermittently revolving bed, each die in succession being thereby brought under a pair of moulding dies, which open laterally, and, when closed, a cavity, the shape of the intended head, is formed between them. A heading plunger works vertically direct into the moulding dies, which plunger, by means of an eccentric cam, is caused to strike several times on the heated end of the piece of rod until the head is moulded thereon to the desired form. The moulding dies, which also rise after each blow, are caused to open slightly, so that the bolt or article under process is not drawn upwards out of the lower die. The next movement of the revolving bed carries the die with the bolt just formed over a rod, which rises and pushes the bolt upwards out of the die.

[Printed, 8*d*. Drawing.]

A.D. 1857, December 9.—Nº 3047.

HADDON, John.—This invention, relating to the manufacture of wood screws and nails, has for its object the application, to the ordinary machinery engaged in the various operations of turning, nicking, pointing, and worming wood screws and also the pointing of round-headed nails, of a self-acting apparatus adapted for feeding the blanks to the several machines employed, and to the cutters used for worming them. This apparatus consists,—

1st. Of a hopper for holding the blanks, and a feeder which raises the blanks and delivers them in regular order shank downwards, on to an inclined plane. The feeder is composed of two thin segmental plates, so placed and packed apart that the heads of the screw blanks can rest on their two upper radial edges, and the shanks of the screw blanks fall between them. These segmental plates are mounted on a horizontal axis, and they move upwards edgewise through a narrow opening in the bottom of the hopper. As they rise they bring up the blanks suspended by their heads, and the upward movement is continued until the radial edges of the plates are brought coincident with the angle of the incline plane, and in contact therewith, so that the screw blanks slide thereon.

2nd. The cutting tools employed are furnished with several cutting points, which act simultaneously on the blank. The upper face of the steel rod which constitutes the worming tool has several grooves throughout its whole length, cut either by a circular cutter in a lathe, or by a planing machine; the distance apart of these grooves is equal to the pitch of the thread, a separate tool being required for every size.

[Printed, 10*d*. Drawing.]

A.D. 1857, December 24.—Nº 3162.

WILSON, Henry Charles Fenwick, and **GREEN**, Thomas.—(*Provisional protection only*.)—This is an invention relating to the manufacture of rivets by a machine which has a double action, alternately making rivets in succession at opposite sides. The feeding apparatus is self-acting, and worked by levers actuated by a scroll on the main shaft. Two vertical levers, operated alternately by cams on the main shaft, carry the heading tools, and two other levers also actuated by cams operate the cutting tools which divide the metal rod into suitable rivet lengths, by means of inclined surfaces; these levers act alternately, the cutting tools sliding against a plate fixed to the head of the machine. This plate has three holes; the rivet rod is fed through the centre hole, where it remains whilst the rivet head is formed, and the other holes have sliding in them rods which push out the finished rivets after the heading operation.

The iron is used in lengths of from one to three feet according to size.

[Printed, 4*d*. No Drawings.]

A.D. 1857, December 24.—N° 3163.

WILSON, HENRY CHARLES FENWICK, and GREEN, THOMAS.—This invention relates to a machine for making rivets. The main cam shaft carries driving pulleys and a fly wheel. Fixed on this shaft to work the operating parts relatively in rotation, there are three cams; one actuates a pair of cutting shears by means of a wedge piece moving in a recess formed in a swinging head, which carries a cutting shear and a spring shear, the fixed shear being bolted to the frame; another cam works the heading tool by means of a cranked lever, the "header" "striking in a horizontal line with the axis of the rivet," is drawn back by a spring. The third cam controls the feeding motion, regulating the length of iron rod which at each revolution is fed into the machine, the feed box being attached to the swinging head, and the bar which is heated is advanced to the shears by a feeding plug, whilst the length which is cut off and held by the swinging head during the heading movement, is regulated by a rack and weight.

The machine is fully described and illustrated.

[Printed, 1*s*. 4*d*. Drawings.]

1858.

A.D. 1858, January 1.—N° 5. (* *)

PARKES, ALEXANDER, and PARKES, HENRY.—"Improvements in the manufacture of rods, wire, nails, and tubes," of copper and its alloys. Copper and its alloys compounded with zinc may be combined with phosphorous or metal manganese, in such proportions that the compound may be "rolled and worked "hot or cold into rods, wire, nails, and tubes."

About 8 oz. or less of phosphorous or metal manganese may be used in each 100 lbs. of the compound.

[Printed, 4*d*. No Drawings.]

A.D. 1858, February 18.—N° 311.

JOHNSON, JOHN HENRY.—(*A communication from Jean Baptiste Fondu, and Emile Boin.*)—(*Provisional protection only.*)—This invention relates to machinery for making bolts and rivets, comprising a fresh arrangement of parts, and a safety apparatus for throwing the machine out of gear with the moving power, whenever the strain upon its operating parts becomes unduly great. The mechanism is mounted upon a horizontal bed-plate, the main driving shaft resting in bearings at one end, and the feeding apparatus at the other, the bars out of which the bolts or rivets are to be made being, either in a heated or cold state, fed to the dies by a pair of grooved rollers, adjustably actuated intermittently by a pawl and ratchet wheel. Each rotation of the machine cuts, by the action of a pair of shears, a piece of metal from the rod, holds it between a pair of slides during the time that the slide which carries the heading die is advanced through the aid of a bent lever by an eccentric cam. So soon as the heading die has moulded and formed the head by pressure it retires, and the holding dies open, when the finished bolt is pushed forward and falls.

[Printed, 4*d*. No Drawings.]

A.D. 1858, February 25.—N° 377.

SLATER, WILLIAM, and SMITH, SAMUEL.—(*Provisional protection only.*)—This invention, relating to machinery or apparatus to be used in the process of turning and cutting metals, consists,—

1st. In "an improved chuck, to be used in ordinary lathes for "turning. This improved chuck is made with a moveable slide, "so arranged that when the article to be turned, or the mandril "is placed in the chuck, it is retained in a perfectly central position by tightening up a set screw. This improved chuck may "be made compound, that is, with two slides placed at right "angles to each other."

2nd. The machinery for cutting metals consists "of a revolving "spindle, to which motion is given in a line with its axis. The "article to be cut is held in a stationary vice or other suitable "instrument. The cutting instrument is fitted into the end of "a spindle, and is brought by suitable levers against the article "to be cut. This machine is particularly useful in rounding up "the ends of bolts, screws, and other articles; it can, however, "be used to make centre or other holes in the ends of shafts, "and in footsteps for spindles, and for various other purposes. "The spindle may remain stationary, and the motion may be "given to the vice or other instrument in which the article is "held."

[Printed, 4*d*. No Drawings.]

A.D. 1858, February 25.—N° 378.

MIDDLETON, Samuel.—This invention relates to uniting or seaming articles of leather by means of wire lacing, and to the fixing of boot and shoe soles to their upper leathers, by short metal pegs varying in length from a quarter to half an inch, according to the quality or thickness of the material. These pegs are pointed at each end, and are by preference triangular or square in transverse section, the edges being jagged or barbed in the style of a fish hook at the opposite ends towards the mid-length, so that they may with facility enter the leather or material, but be difficult to withdraw. The two ends of the pegs may pass completely through the two pieces of material, and be clinched when the two pieces are pressed together.

Describes the apparatus employed for fastening soles to the upper leathers of boots and shoes, the leather being worked in a wet state contracts whilst drying round the pegs, so that the barbs thereon become imbedded in the material.

[Printed, 2*s*. 4*d*. Drawings.]

A.D. 1858, March 12.—N° 504.

WRIGHT, James.—(*A communication.*)—(*Provisional protection only.*)—The object of this invention is an improved mode of treating machine-made malleable iron nails. It is described by the patentee as follows:—

"Machine-made malleable iron nails as at present made from "cold metal are in many cases of small value, from the want of "toughness and flexibility, as well as the bluntness of their "points. In order to obviate these, I propose immediately after "the nail is formed by the machine to point them by the hand, "or by another machine, and then to anneal them. I effect the "annealing process by placing the nails on a plate or oven which "is raised to a high temperature, and then gradually cooled, or "by causing it to traverse from a highly heated part to a cooler "one. The nails I then find are equal to the best hand-made "nails."

[Printed, 4*d*. No Drawings.]

A.D. 1858, March 13.—N° 515.

RIDDLE, William.—(*Provisional protection only.*)—This invention relates to the manufacture of wrought-iron nails, which are forged "in dies suitably formed for making the sides" of the nails "concave, and the angles jagged or barbed."

[Printed, 4*d*. No Drawings.]

A.D. 1858, March 17.—N° 548.

WARD, William.—This is an invention of a machine adapted to the manufacture of nails, spikes, bolts, rivets, screw-blanks and nuts. The operating parts of the machine, which has double action, are mounted on suitable bearings fixed upon a bed plate. They are brought into activity by two horizontal shafts, placed relatively at right angles, one driven by the motive power actuating the other by bevel gearing. Upon the latter shaft are fixed two co-operating cams, which give reciprocatory motion to a sliding piece that carries two dies, the companion dies of which are disposed on fixed standards bolted to the bed plate. Fixed on the driving shaft are two eccentrics, to the rods of which are jointed two plungers, which carry the heading tools and have relatively alternate reciprocating motion in suitable horizontal guides. The heated ends of two rods are by turns fed into the machine, respectively in a line with the action of the heading punches, and on them respectively the two pairs of dies alternately operate, the movements of the heading punches being timed to advance and at the proper moment form heads on the rivets or article under process, the movable dies acting also as cutters, sever the required length of metal from the ends of the two rods respectively, and after the operation cause the finished article to fall from the machine. When one section of the machine is set for making nuts, instead of the heading tool a taper or chisel pointed piercing punch is substituted. This punch carrying a clearing collar causes the lateral expansion of the metal in the dies which co-operate to mould the nuts to the desired form, appropriate dies being selected according to the nature of the work.

[Printed, 1*s*. Drawings.]

A.D. 1858, March 20.—N° 584.

ALLEN, William.—(*Provisional protection only.*)—This invention, relating to the manufacture of screws, "has for its object the " rendering screw cutting machines more self-acting than here- " tofore, and thus avoiding the necessity of a person constantly " attending to such machines. For these purposes the head- " stocks, spindles, and pulleys are as heretofore, but in each " machine a pinion gives motion to a cog wheel on an axis on " which there is a bevilled toothed wheel, which takes into and " drives another bevilled toothed wheel on an axis at right angles " to the previously mentioned axis, and such last-mentioned axis, " by a worm or screw, gives motion to a screw wheel on an " axis, on one end of which is affixed a face plate with moveable " studs or projections, the face plate being formed with holes to " receive such moveable studs; and these studs or projections are " placed at distances apart on the face plate, according to the " length of screws to be cut. The studs or projections act on a " lever, which act on the dies, and such lever is pressed or acted " on by another lever and by a weight or spring."

[Printed, 4*d*. No Drawings.]

A.D. 1858, March 31.—N° 691.

BARR, Robert.—(*Provisional protection only.*)—This invention relates to machinery for making rivets, spikes, nails, screw-blanks, and similar articles. Under one modification, the machine takes the form of a vertical drill, the driving power being obtained either from a small engine cylinder bolted to the frame or by means of a driving strap from the motive power. The operating parts of the machine consist of a ram, which has vertical action in suitable guides attached to the framing, and carries at its lower end the particular die which, for the time being, is required to form the head of the article under process. This die corresponds by turns with each of a series of dies or recesses, circumposed at equal radial and segmental distances on the upper face of an intermittently revolving thick circular die plate, which rests in an annular recess formed upon the solid base of the machine, and in such a position, that at each move or portion of a revolution, the dies in succession come directly beneath the die carried by the ram. The lengths of metal for making the rivets or articles are severed from the bars by a segmental "lever action" cutter, operated by the main gearing by means of an intermediate crank, the pieces being severally deposited, one in each die prior to the descent of the ram, which moulds the heads, the finished rivets or articles being cleared from the dies by the lifting of a central stud, with which each die is furnished, the studs in succession being raised by a wedge.

The apparatus may be so modified by substituting sliding die plates for the circular die plate, that a number of rams may be made to operate at the same time.

[Printed, 4*d*. No Drawings.]

A.D. 1858, April 17.—N° 840.

CARRON, William.—The object of this invention is by a system of plate models, to produce moulds for casting nails, spikes, and bolts; it is applicable,—

1st, To making moulds for casting large nails. "I take a plate "of metal or other suitable substance, on one side of which are a "series of patterns nearly of the form of the nail to be cast, the "said patterns being of a form such as would be produced by laying the nail flat upon the plate, so much of the head being "removed from one side as will permit the body of the nail to lie "flat upon the said plate. On the other side of the said plate is "a series of patterns of the form of the portions of the heads cut "away from the patterns on the other side, the said portions of "heads being exactly opposite the parts from which portions "have been cut off from the pattern nails. The two sides of the "mould are formed upon the two sides of the said plate, and the "said plate being removed, the two sides of the mould are brought "together, when they form a mould of the figure of the nails to "be cast. Or each of the pattern nails may be divided in a "plane passing along the axis of the nail, and the halves of the

" nails placed opposite to each other on the two sides of the plate. " The two sides of the mould are made from the two sides of the " said plate."

2nd. To making moulds for casting nails with mushroom and other shaped heads otherwise than flat. " I take a plate having " holes, through which the pattern nails pass upto their heads. " One side of the mould is formed on one side of the plate, and " has impressions of the heads; the other side of the mould is " formed on the other side of the plate, and has impressions of " the bodies of the nails."

3rd. To making moulds for nails required to have flat heads. " I take a plate on which are affixed the pattern nails, the said " nails being placed with the top or flat parts of the heads upon " the plate, the nails being perpendicular to the plate. One side " of the mould is formed upon the side of the plate carrying the " pattern nails, the other side of the mould is a flat surface. The " last described method may be modified."

[Printed, 10*d*. Drawings.]

A.D. 1858, April 26.—N° 923.

DOBSON, Thomas.—(*Provisional protection only.*)—This is an invention of a machine designed for forging iron, adapted for forging bolts and heavy work, and intended to supersede the use of sledge hammers. " The apparatus consists of two upright " frames or cheeks, between which the hammer helve vibrates, " being fixed on a centre or shaft in the rear of the frames. Two " horizontal slots are formed in the frame, to allow of slide blocks " working in them, for the purpose of carrying the ends of a " transverse shaft, on which is fixed a pulley, fly wheel, and " double cam for raising the hammer; this shaft is moved backward or forward in a horizontal direction by means of a screw " or lever and quadrant fixed to the back plate of the machine, " and connected to the slide blocks by suitable links, in order to " bring the cam shaft nearer to or farther from the fulcrum of the " helve hammer, so as to regulate the fall of the hammer, and " consequently the force of blow to be given."

" In order to bring the hammer directly over any part of the " anvil or block where it may be required, a screw or lever and " quadrant is fixed to the bed plate of the machine, and connected " by suitable links to the back plate. The frames or cheeks being

" grooved on the under side, the whole machine is capable of
" being slid to and fro on projections cast on the bed correspond-
" ing with the grooves above mentioned; the bed plate may be
" either bolted down to the floor of the shop or placed on wheels,
" so as to be easily removed from one anvil to another. The
" machine may be driven from any suitable shafting."

The force of the blow is increased by the reaction of a spring acting upon the hammer helve.

[Printed, 4*d*. No Drawings.]

A.D. 1858, May 17.—N° 1100. (* *)

HILER, **Selah**.—(*Provisional protection only.*)—" An improved
" method of coating or amalgamating iron with silver, copper,
" brass, or other metals, or alloys of metals."

The inventor states :—" The nature of my said invention con-
" sists in forming a surface of brass or other ornamental metal on
" iron or steel as follows :—"

" I take a suitable sheet, bar, or block of wrought iron, (or
" steel), and clean the surface thereof on one or more sides and
" heat the same, and while heated cast on to said surface or
" surfaces the brass or other metal, and the union may be
" accelerated by the use of borax or other flux, or the coating
" metal may be united to the iron while the latter is in a state of
" fusion, and the brass or other metal is to bear the desired pro-
" portionate thickness to that of the iron.

" The iron and brass, or other plating metals may then be
" rolled down to the desired shape or thickness, or cut out, or
" made up into any articles for which said plated or coated iron
" may be adapted, such as buttons, stair rods, tubing, bells,
" hinges, bolts, and other articles."

[Printed, 4*d*. No Drawings.]

A.D. 1858, May 19.—N° 1111.

BROWN, **Jeremiah**.—This invention relates to machinery and apparatus adapted to the manufacture and rolling of iron and steel, consisting in the employment, for performing the early stages of the process, of mechanical puddlers which stir and agitate and keep in motion the iron in the puddling furnace, and a percussive machine for squeezing, fashioning, and combining the puddle ball or balls in a heating furnace, preparatory to the subsequent processes of hammering or rolling. The actuating power in both cases is a small steam engine combined with each apparatus. The puddling machine is mounted on a carriage, and by shifting its position it is made to operate in several furnaces in succession, and the percussive machine is a kind of vertical steam ram or plunger, which descends into the furnace and operates therein upon the metal balls, ramming and striking so as to unite and weld them together. A large pair of travelling forceps are employed to transfer the metal to and from the furnaces during its manufacture. In the process of rolling the metal to form it into bars, it is made to pass in succession between several pairs of rolls forming a series, and if necessary through a second series, and thence the bars are passed through cleansing rollers, which are furnished with teeth, filing, or grinding surfaces, for scraping or filing off and removing the superficial scale.

Describes the mode employed for making and uniting the parts of iron girders and similar structures, and a particular method of preparing by a rolling process, bars of iron suitable for the manufacture of screw nuts. The metal is rolled direct from the puddled bloom into the form of semi-tubular rods, which are afterwards placed edge to edge together and welded, thereby producing thick metallic tubes, out of which "nuts may be conve-"niently formed."

[Printed, 2*s*. 2*d*. Drawings.]

A.D. 1858, May 21.—N° 1131.

BAKEWELL, Frederick Collier. — (*A communication.*) — The object of this invention, which relates to the manufacture of bolts, is to form mechanically upon such articles symetrically shaped heads without injury to the quality of the metal or the strength of the bolt. This result is obtained by a machine in which the rapid blows of a swinging upsetting hammer, repeatedly alternating with the pressure of converging dies, are caused to operate upon the heated end of the bolt. "A stationary heading "tool which consists of a circular block of steel with two parallel "plane faces and a hole in the centre of the diameter of the neck "of the bolt to made, is arranged centrally to converging dies, "which are moveable in grooves that radiate from the centre of "a disc wherein the heading tool is placed. The ends of the "dies which press against the head of the bolt slide upon the

" upper surface of the heading tool, and the other ends are " bevelled and project beyond the circumference of the disc. " By this arrangement the bevelled projecting ends may be forced " into the grooves against the head of the bolt by upright rounded " projections or tappets fixed on to a tappit ring that is turned " round when the machine is in action. The dies are imme- " diately afterwards withdrawn, and the hammer, which is fixed " to a horizontal shaft, falls and strikes the head of the bolt. " These actions are repeated rapidly until the head of the bolt " is completely formed; it is then forced upwards by a piston " and removed."

[Printed, 8*d*. Drawing.]

A.D. 1858, May 25.—N° 1166.

MONNIN, Charles Frederic Dietz.—(*A communication.*)—This invention relates to a series of machines designed for the manufacture of screws, rivets, spikes, pins, and nails, comprising machines for heading, others for turning and nicking, threading or worming, and to apparatus for feeding and removing the screws or blanks to and from the several machines.

The heading machine operates by means of two heading dies which act on the ends of the wire pieces in succession, one partly forming and the other finishing the head of the blank. The principal feature in this machine is an intermittently revolving die holder, containing four square steel blocks which occupy the centre of the holder, and each block being semi-circularly grooved at the sides, they form four pairs of holding dies, into which by turns the end of the wire is projected by the feeding apparatus and cut off against a fixed cutter when the holder moves a quarter of a revolution after each interval of rest, bringing in succession the pieces directly opposite the first heading punch, and at the next move opposite the second heading punch, and thence as they come round in rotation to the feeding point, they by turns are pushed out of the dies as the wire is fed in.

Modifications of this machine are described. In the machines for turning and nicking, the screw blanks are held by jaws fixed at the ends respectively of two mandrils, mounted to revolve parallel with each other in a frame which oscillates on a central shaft, so that by turning over the frame, the mandrils are made to take two positions, first bringing the blanks before the cutting tool which turns the heads, and secondly opposite a circular saw which cross-cuts the head and forms the nick. The blanks are fed to the holding jaws whilst the mandrils revolve.

The worming or threading dies employed in the worming machine are segmental pieces of steel turned to the proper sectional form throughout their whole length, so that they may be easily sharpened by grinding the end to the proper angle.

Describes the apparatus employed for feeding and removing the blanks to and from the machines. In this apparatus is combined a picker for receiving the blanks instead of allowing them to fall when the holding jaws or apparatus relax, or the blanks are pushed therefrom.

[Printed, 2*s.* 10*d.* Drawing.]

A.D. 1858, June 4.—N° 1258.

DICKSON, John Farmerley.—This invention relates to the construction of the permanent ways of such railways as lay on longitudinal sleepers; these sleepers are made of plate iron, and a variety consisting in transverse section of divers bent or grooved forms, adapted for holding the rails by means of bolts or wedges, and affording the necessary support on the ballast, are described and illustrated.

The nuts of the screw bolts employed are fitted with a pawl or clack to prevent them from re-turning after having been screwed or tightened up; the threaded end of the bolt is allowed to project a short distance through the nut, and the end is furnished or shaped with a series of ratchet notches into which the end of the pawl, which is carried on a stud fixed in the top of the nut, falls as the nut is turned and tightened. By this means whilst the pawl remains in the notch all tendency in the nut to unscrew in consequence of constant shocks and concussions is effectually prevented, an additional quantity of metal being left to strengthen that side of the nut which receives the stud. The ends of screws are also notched in the same manner, and the stud which carries the pawl is fixed in the metal or material through which passes the bolt end which is made sufficiently long to protrude the required distance. If necessary all chance of the regression of the catch or pawl may be prevented by a spring.

[Printed, 1*s.* Drawings.]

A.D. 1858, June 10.—Nº 1318.

CHATWIN, THOMAS, and TAYLOR, CHARLES.—This invention relates to the manufacture of screw stocks, which are constructed to operate with three screw cutting dies. The body of the die holder is a kind of oval box containing one fixed die and two dies moveable in grooves radiating from a common centre. The two dies which slide in the grooves are caused to advance towards the fixed die by two sliding bolts, one bolt to each die, and these bolts are moved simultaneously by a screw formed either on one of the handles, or fitted to the die holder to act at right angles therewith, a washer being intermediately placed between the ends of the bolts and a collar which is formed on the screw. In some cases all the dies are movable and trigonally placed in grooves radiating from the centre of a circular die box, and caused to converge simultaneously by means of a ring, which is screwed into the interior of the die box, and is fashioned internally with three paracentric inclines, which force up the dies when the ring is turned. The divergence of the dies may if necessary be effected by springs.

[Printed, 10*d*. Drawings.]

A.D. 1858, June 24.—Nº 1429.

JOHNSON, JOHN HENRY.—(*A communication.*)—This is an invention of a machine adapted for making bolts and rivets, from rods either in a heated or cold state, the machine being provided with a safety apparatus, devised to free it from the driving power, should the strain upon the operating parts of the mechanism become unduly great. The machine comprises a horizontal bed plate, the feeding mechanism being at one end, and the driving shaft at the other. This shaft gives motion to a spur wheel on an intermediate cam shaft by means of a pinion, which is attached to the driving shaft by bolts or pins, that bear laterally against two cutting plates, and are so arranged, that if at any time any undue resistance is offered to the movements of the machine, the cutting plates will sever the bolts and set the machine free. The metal bars are fed into the machine at intervals by two grooved rollers, which obtain adjustable intermittent motion by means of a pawl and ratchet wheel, actuated by a cam on the cam shaft. A pair of shears, obtaining motion through toggle-jointed levers from a cam on the cam shaft, sever the pieces in succession from the rod, the pieces being simultaneously gripped by two slides actuated also by the levers, and are thereby held during the operation of the heading die. This die, carried by a slide and capable of adjustment, is brought forward by a bent lever, which also obtains motion from a cam on the cam shaft, the return motion of the die being effected by another cam. After the heading operation the gripping slides are opened by means of a short lever, the finished rivet is pushed forward and falls, and the feed motion again presents the end of the rod to the shears.

"The machine may be constructed with two or more sets of dies " and attendant mechanism, so as to manufacture any desired " number of bolts or rivets at one time."

[Printed, 10*d.* Drawings.]

A.D. 1858, June 28.—N° 1458.

NEWTON, William Edward. — (*A communication.*) — The object of this invention, which relates to the manufacture of cut nails, is so to improve upon that class of machines, wherein a rotary disc with two cutters and vibrating anvil are employed, as to render them capable of making nails of different sizes and forms, with heads shouldered or projecting from all four sides of the shank; this is partly effected simply by a change of cutters, a heading apparatus not being required. To complete the desired result, it is necessary that the plate from which the nails are to be cut be first rolled, so as to raise a square bead or flange on both sides along each edge, and that the anvil cutter be correspondingly grooved, so that the body of the nail plate may fairly bed upon its surface, as the two cutters alternately come round and so cut the nails transversely from the end of the plate, that the heads are formed by turns in succession from the square beads or flanges raised by the rolling process along its two sides. The vibrating anvil and its cutter are placed inclining downwards from the cutting point, in which position the plate is presented at a more favorable angle for the rotating cutters to operate, and the vibrations of the anvil are necessary in order that the position of its cutter may change after every cut, so as to correspond alternately with the two revolving cutters, as they by turns come round.

[Printed, 10*d.* Drawing.]

A.D. 1858, July 2.—N° 1489.

SELLERS, William.—The object of this invention relating to the sliding or turning, and to cutting screw threads on shafts or cylindrical rings, is so to sustain the metal during the operation that lateral vibration is prevented. It "consists in combining "with suitable rotating cutters or instruments for cutting or "reducing the surface of a bar, a guide bar or bed having one "or more chucks or rests sliding thereon, to gripe and hold the "bar at given distances apart, to keep the said bar from turning, "to hold it in line, and to prevent vibration, the said chucks or "supports being so arranged that they shall move towards the "rotating cutters in the direction of the axis of the finished bar "or ring, and that they may be removed in succession as the "operation progresses; and it also consists in combining with "the foregoing combination suitable supports to sustain the bar "in a central position beyond the cutters, whether said supports "be or not be self-adapting to any slight inaccuracy in the "finished bar; and it also consists in combining with the foregoing combination, a mode of sustaining in a central position "that end of the bar which is first to be operated upon by the "cutters.

"A hole must be made through the centre of the cutter head "of sufficient size to admit the largest shaft the machine will "operate upon. On the front end or face plate of this head, "any number of cutters may be placed that may be deemed most "serviceable; I prefer four which are placed radially, and are "retained in their places and adjusted by two set screws to each "cutter."

The machine may be modified by changing the movements of the operating parts, so as to cause the revolving cutter head whilst operating, to travel along the shaft, the latter remaining fixed, and thus, by the use of suitable cutters and proper regulation of the feed motion, screw threads may be cut on bars.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1858, July 7.—N° 1528.

WESTON, Joseph Dodge.—This invention relates to the process of rolling iron, adapted for the manufacture of bolts and pins. The peculiarity consists in so rolling rods or bars of iron, as to produce enlargements or short angular projections at regular intervals on one or more than one side of the round rod or bar, and after this rolling process the rods are to be so divided or cut into bolt lengths, that upon each bolt the enlargements left by the rollers form an angular projection or projections on the shank, beneath and attached to the underside of the head, which is to be upset by a heading tool furnished with a suitable moulding die, appropriate holding dies recessed to protect the projections on the bolt pieces being required.

The rollers employed are furnished with recesses or indentations in their grooved peripheries, which correspond in size and depth with the length and heights of the projections required on the bars, and as the rollers are revolved at a uniform speed, the recesses in one roller meet respectively the recesses in the other roller, and thus is formed by the two rollers a connected series of revolving dies.

[Printed, 8*d*. Drawing.]

A.D. 1858, July 14.—N° 1582.

COWAN, Joseph.—(*Provisional protection only.*)—The object of this invention is the construction of a screw-nail, which is driven as an ordinary nail by a hammer, but cannot be withdrawn excepting by a screw-driver without fracturing the wood. The screw nails are constructed with one or two spiral threads running once or twice round the shank, so that the pitch is very coarse, causing them to turn when driven into timber or other like substance, by the blows of a hammer on the head, which in the case of small screw nails is cross-nicked for the purpose of receiving the end of a screwdriver when required to be withdrawn; and in the case of large nails, spikes, or bolt screws, for railway, ship, and similar purposes, the head is made square to accommodate a turnscrew.

"As an additional security, if preferred, the screws may be "jagged on the edges of the threads to prevent the possibility "of their screwing themselves out by vibration or other straining "action."

"In constructing large screw nails (or spikes) according to this "invention that are intended for mill, railway, ship, and other "like work, it is preferred to form the head square or round "and notched on the edges, for the purpose of applying a suitable "turnscrew to withdraw them when required, and also for the "purpose of allowing a small nail to be driven down through the "side of the head to secure the screw nail in its position when "driven home."

[Printed, 4*d*. No Drawings.]

A.D. 1858, July 30.—Nº 1721. (* *)

SPENCE, JAMES.—(*Provisional protection only.*)—"An im-"provement in the manufacture of sheet, hoop, and nail-rod "iron." Sheets, hoops, and rods, instead of being made from charcoal iron or converted steel, are proposed to be made from puddled steel, produced directly from pig iron in the puddling furnace.

[Printed, 4*d*. No Drawings.]

A.D. 1858, August 3.—Nº 1764.

NEWTON, ALFRED NEWTON.—(*A communication.*)—This invention, relating to machinery for forging nails and other articles, is supplementary to prior letters patent which were granted to this patentee, and bear date November 25th, 1856, No. 2798. The original machine operates by means of two pairs of hammers which strike alternately, one pair upon the two opposite sides, and the other pair on the top and bottom respectively of the nail or forging under process. A duplex cam occupying a central position, and acting simultaneously on the helves of each pair of hammers, and alternately on the two pairs, drove the latter by turns apart, and the reaction of spiral springs, coiled round the bolts or centres on which the helves vibrated was availed of for delivery of what are termed elastic blows. In practice it has been found necessary, to the effective working of the machine, that the spiral coils of the springs must be placed on centres differing in position, and independent of the centres on which the helves respectively vibrate, "and sufficiently far removed therefrom to cause "the bearing points of the springs upon the helves to vary "according to the position of the helves themselves, so that at "the instant when the latter are about to pass off the point of the "cam, the springs shall bear upon them sufficiently far from their "pivots to throw them quickly together, and prevent them from "being again caught by the cam before they have effected their "blow, and at the moment when the hammers come together, "that the springs may bear upon the helves at a point much "nearer to their pivots, and thus exert much less power, whereby "the required elasticity of the blow will be preserved."

In addition to the above, adjustable check pieces are applied for causing the two side hammers to work truly on the same plane, and in order that the nails as they are severally in succession forged, may be cut off the rod by the machine itself, a lateral motion is given to the table over which the heated rod is fed into the machinery, so as to bring it under a pair of cutters, the hammers the while being retained in an open position.

[Printed, 1*s*. Drawings.]

A.D. 1858, August 4.—N° 1769.

RUSSELL, John James.—This invention has for its object an improved arrangement of machinery for cutting and forming screw threads on the ends of tubes. To this end the tube is introduced through a tubular mandril, and so fixed therein that the two ends of the tube are left projecting. The mandril, which by means of suitable gearing can be made to revolve in either direction, is mounted in a headstock which rests on a suitable bed. Placed upon guide rails, which project from each end of the headstock, in a position to operate upon both ends of the tube, are two adjustable sliding carriages, which carry the cutting instruments for squaring the ends of the tube or reducing its length, and the dies or screw tools for forming the threads, the sliding carriages being capable of a transverse movement, so that after—say the cutting instruments have operated on each end of the tube, they are, by one simple movement of the slide, withdrawn, and the screw tools are advanced to form the threads, thereby avoiding the labour and loss of time required to remove the tubes from a cutting-off apparatus, to that which forms the thread.

[Printed, 1*s*. 8*d*. Drawings.]

A.D. 1858, August 19.—N° 1885.

PILBEAM, Alexander.—This invention relates to the making of screws, the penetrating ends of which are shaped as a bradawl, parallel and plain towards the end, which inclines to a cutting edge. "In use it merely requires to be struck with the hammer
" down to the end of the bradawl part and commencement of
" the screw; the screw driver must then be applied to turn it,
" and it will be found to penetrate the wood as quickly, if not
" quicker, than the ordinary screw, which requires a hole to be made
" for it first, and is much more secure; as the fibres are broken
" away by the bradawl part, they arrange themselves between the

" threads of the screw; and it will also be seen that by being " able to use the screw direct, one half the labour is saved. They " can be made of all sizes, and applied to hooks, studs, and " rings, and anywhere where a screw is necessary."

[Printed, 8*d*. Drawing.]

A.D. 1858, September 9.—N° 2038.

NEWBERRY, John Gustavus.—This invention relates to machinery adapted for tapping the screw threads in nuts, and for cutting the threads on bolts and screws. The parts combined represent, supported on columns, a top driving frame supporting horizontal shafts carrying strap pulleys for differential speeds, and a fly wheel to render speed uniform. Beneath are arranged two machines, one mounting two sets of apparatus, the other being a single machine. Each machine has a central horizontal spindle, which rests in appropriate bearings and has fixed upon it at the back end, strap pulleys which obtain motion from the driving apparatus above. On the fore end, the spindle of each machine carries the holding chuck, centrally projecting from which is the tap, and directly in front, resting on guides so as to be capable of moving to and fro in a line with the tap, is the sliding head which carries and holds the nut in a clamping piece, whilst the tap enters it and cuts the thread, the nut passing on to the plain stem of the tap, where after successive operations the nuts having accumulated, they are removed by temporally removing the tap from the chuck. When threads are to be cut on bolts or screws, the dies are fitted in the holding chuck and the head of the bolt or screw is held by the sliding head, which is then pressed up to the dies, and when the latter have cut the thread, they are caused by means of a lever and small connecting rods to open apart, and thereby liberate to the finished bolt.

According to the nature of the work, modifications are required in the holding chuck and the sliding head, and in the case of wood screws a small circular saw is suitably mounted on the machine to cross nick the heads.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1858, September 14.—N° 2089. (* *)

COCHRANE, The Honorable William Erskine.—" An im- " provement in the fastenings of railways."

"In the introduction of pins or rods of a hard material, which " will not shrink transversely through the wood fastenings, so " that the ends of the pins may come flush with the sides of the " wood fastenings. By this means, when a wood fastening is " driven in between the cheek of a railway chair and a rail therein, " the ends of the pins will come in contact with the inner surface " of the wood and with the rail, and will notwithstanding the " shrinking of the wood still retain the rail or rails secure."

[Printed, 10*d*. Drawing.]

A.D. 1858, October 15.—N° 2306.

BOUSFIELD, George Tomlinson.—(*A communication from New York.*)—This invention relating to the cutting of wood screws, has reference to that class of machines whereby the threads are formed by chasing tools, and not by dies, the object being to carry the thread from the part where it usually begins on the blank, right down to the point of the screw, the part or barrel which carries the thread having at the upper part or beginning, the form of a conical frustum, thence running parallel for the usual length, and then tapering to a point. This form of screw is produced by the peculiar form of the cutting or chasing tool, which has two cutting edges respectively at different angles; one for cutting the parallel surfaces and the other for cutting the inclines. Instead of both cutting edges being formed on one chasing tool, two tools may be employed, and the apparatus may be adapted to ordinary screw cutting machines. The head and the plain part of the screw blank is gripped in a tubular holder, and the free end of the stem is received in a steel tubular rest, which has a slotted opening at the side to permit the approach of the tool. The latter has whilst cutting, a longitudinal movement in the direction of the point, where it is withdrawn by a lateral movement and returned towards the head to make the next cut, the operation being repeated until a perfect thread is formed.

[Printed, 8*d*. Drawing.]

A.D. 1858, October 19.—N° 2330.

BATHO, William Fothergill, and BAUER, Eugene Moritz.—(*Provisional protection only.*)—This invention relates to screw worms and worm wheels, and to apparatus adapted for cutting them. It is described as follows:—"We construct worms " and worm wheels to work together, so that their pitch lines

" will coincide, and that all the teeth of the worm will bear evenly " on the teeth of the worm wheel. Hitherto the pitch line of " the worm has been tangent to that of the worm wheel, consequently the wearing surface has been very small, only one or " two of the teeth being in gear at the same time."

"Our machine or apparatus can either be applied to a common " slide lathe, or it can be made to work independently, and consists of a bed or stand, on which we place two headstocks which " carry a maundril; between the headstocks we have a slide carrying a revolving chuck, and a train of wheels which impart a " rotary motion to both the maundril and the chuck for cutting " the worm; we secure it on the maundril and the cutting tool in " the chuck, which gives us a concave worm, and by reversing " the operation, and placing the worm wheel where we had the " chuck, and the cutter where we had the worm, we are enabled " to give the true screw form of thread to the teeth of the worm " wheel."

"Our said invention is applicable to cutting the teeth of other " kinds of wheels, as well as screws, worm wheels, and worms,"

[Printed, 4*d*. No Drawings.]

A.D. 1858, October 20.—N° 2341.

CLEGG, Robert Dawson.—This invention, relating to the manufacture of screws, consists in making such screws with gimblet points, so that they can effect an entrance into the wood or material, without any necessity for first boring a hole. The mode adopted for producing these screws is not described, but exhibited on the drawing is a number of screws differing in size, and with points varying in form. Some of these screws have ordinary gimblet points, others have screwed points with spiral cutters, and one has the form of a centre-bit. These screws may be applied to hooks, rings, handles, knobs, arms, brackets, and to all other purposes where ordinary wood screws can be employed.

[Printed, 6*d*. Drawing.]

A.D. 1858, October 29.—N° 2413. (* *)

KIRRAGE, William.—"An improved elastic combination of " materials impervious to atmospheric influences, as a substitute " for hard woods, metal, leather, or felting, and for other " purposes."

"If the new compound is intended to be employed for iron " gutter flanges, or for washers to pipes for water-works, or for " flange joints, washers or collars to gas, steam, or water pipes, but " in all cases where the heat is under two hundred degree Fahrenheit, or for packing under iron columns, or between stone and " metal, or metal and metal, proceed as follows:—I take twelve " pounds of india-rubber, four pounds of gutta percha, twenty-" five pounds of Stockholm or coal tar, sixty pounds of fine pow-" dered chalk, four pounds of hemp or other fibre, and ten pounds " of sulphur. These quantities will make one hundredweight of " the compound. The india-rubber is first masticated or brought " into a state of pulp, by a masticator which works the india-" rubber without tearing it, aided by a heated chamber, the heat " being higher or lower according to the nature of the india-" rubber, care being taken not to use a temperature which will " injure the rubber. The other materials constituting the com-" pounds are added, and thoroughly incorporated with the rubber " after it has been reduced to the pulpy state by the masticator."

The above compounds "having been formed by moulds, or " rolled, cut, or stamped into the required articles, is placed in a " steam chamber and hardened by the action of steam, of from " thirty to fifty pounds pressure on the square inch," or by heat alone. The compound may be varied in its proportions when applied to other purposes; any required tint may be imparted to it by the addition of suitable colouring matter.

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 5.—Nº 2471.

TILL, THOMAS.—This invention, relating to the manufacture of nails, and to compressing metals for similar purposes, consists of a machine so constructed that a cam or crank gives longitudinal reciprocating motion to a bar, which carries two adjustable heading tools, one at each end. These tools alternately act, in conjunction with stationary dies, to form the heads on nails; and other reciprocating bars actuated by similar devices in the same machine, by means of suitable dies perform the holding and pointing process. The rod or wire employed for making the nails is forced into the holding dies by a lever arm, which, for the purpose of holding the rod or wire, is furnished with tongs or nippers, that are made to open and close by means of a wedge. The pointing dies shape the nail by compression, and hold it whilst the heading dies operate and form the head. By means of a friction roller fixed on an eccentric pin, a fresh coil of wire or rod may be supplied without stopping the machine.

A modification of the feeding motion is described.

[Printed, 10*d*. Drawings.]

A.D. 1858, November 10.—Nº 2518. (* *)

CORNER, John.—"Improvements in machinery for making " metallic screw rivets, and for uniting with them parts of boots, " shoes, portmanteaus, leather hose, buckets, harness, and other " leathern articles." The machine "consists of an ordinary lathe " bed 5 ft. long, mounted on the usual standards and furnished " with a crank shaft, treadle, fly wheel, and speed pullies, and " with headstocks," also with "a bobbin, chuck, screw tools, " and shears of peculiar construction, for carrying, advancing, " and cutting the thread, screwing the wire into the leather, and " cutting off the rivet when so screwed in." There are two headstocks, one of which carries the bobbin or reel on which is coiled the wire to be screwed. "The reel is made of wood with metal " sides, and is provided with a suitable arrangement for easily " removing one of these for the purpose of slipping the wire over." It also carries in bearings "a chuck on which are mounted rollers " having milled grooves for the purpose of advancing and turning round the wire, the rollers being caused to revolve by suitable gearing working into a stationary toothed wheel fixed on " the headstock." The chuck (either of steel or wrought iron) " has an internal thread, corresponding to the thread on the coil " carrier, on which it is screwed, and by which it is driven. It " has two grooves, which are at right angles to each other, and " into which are fitted the four carefully turned steel rollers. " These have grooves turned in the centre of the body, which are " milled, and are of such a shape that they grip and slightly " flatten the wire for making the rivets in passing through." The two pairs of rollers are at right angles to each other. The other headstock "carries the cutting-off shears, which are actuated by " a cam fixed on a revolving shaft, and the length of rivets cut " off is varied by altering the position of a band upon two cone " pulleys, so as to vary the speed of the cam shaft. Provision is " also made for stopping the screwing motion while the cutting " off is being performed. The main object of the wire being " caused to advance and revolve at the same time is, that the

" boot, shoe, or other article need merely be held steady with a " previously drilled hole opposite the advancing wire, and the " latter will make its way in until a sufficient length has penetrated, when the machine itself performs the cutting off; and " the screwing motion being stopped for a short time, as before " mentioned, gives an opportunity for placing another hole opposite the wire before the latter has advanced beyond the shears." The action of the machine, its various parts, the connection of one part with another, the form of shears for cutting the wire, and the advancement of the shears by a curved wedge while the shearing is performed, and the arrangement for detaching the screwing apparatus while the cutting is being effected, are minutely described in the specification.

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1858, November 24.—N° 2666.

NEWTON, Alfred Vincent.—(*A communication.*)—This invention relates to machinery for making bolts and rivets, arranged so that the dies and headers, which are combined in a rotary stock, are accessible at all times for inspection or replacement, whether the machine be in motion or at rest. " The dies are " fixed, the one-half in clamps, hinged to the periphery of the " stock, and the other half let into the stock, while the headers " (one for each pair of dies) work in sockets in the rear of the " dies, and parallel with the axis of rotation of the stock. Combined with the stock so fitted is a feed rest and cutter, of such " form and construction as to facilitate the feeding in of the rod " to form the bolts, and to effect the severance of the rod by the " rotation of the stock, to form the blanks without expanding the " rod at the point severed, and afford support to the point of the " bolt or rivet during the process of heading. For releasing the " formed bolt or rivet from the dies, the hinged clamps are tripped " up by a projection on the rear end coming against fixed bowles, " and the dies are thus opened; sliding rods in the dies are then " thrust forward by springs provided for the purpose, and the " formed bolt is ejected from one or other division of the die. " The dies are further constructed, so that a distinct part forming " the shoulder, against which the head of the bolt or rivet will be " made, may be easily removed and replaced, and a lip at their " outer ends is provided, which will not only facilitate the severing

" of the blank, but leave the end of the formed bolt or rivet " slightly pointed."

[Printed, 1s. Drawings.]

A.D. 1858, November 29.—Nº 2716.

HENRY, William Arthur.—This is an invention of "appa-" ratus for attaching the soles and heels of boots and shoes to the " upper leathers, and in the fastenings employed for that pur-" pose." The main feature of this apparatus or screw inserting machine is a spindle which, rotating in appropriate bearings, is caused to revolve by a driving pulley, and is capable whilst revolving of sliding lenghwise in its bearings. The end or nose of the spindle carries a pair of grippers for holding the fastening whilst by the rotations of the spindle it is being inserted or screwed into the sole, suitable contrivances being devised for closing and opening the grippers after each successive operation. When ordinary screws are used it is necessary to make holes in the sole to receive them, but when the improved fastenings are employed no holes are required.

" The first of these improved fastenings consist simply of a short " length of wire twisted or coiled into a helical form, so as to " resemble the worm af a corkscrew, and has one end sharpened " so as to enter freely the leather of the sole. It is obvious that " such a fastening cannot possibly be accidentally loosened or " removed like the present screws, and it also offers the great " advantage of a spring or yielding action when under the " pressure of the foot, by reason of its helical form, thus obvi-" ating entirely the unpleasantness of the ordinary screws, " which from their unyielding nature impart a disagreeable " rigidity to the sole when under the influence of a downward " pressure. The second form of fastening consists of a screw " formed of wire slightly tapering with a gimblet point."

[Printed, 1s. Drawings.]

A.D. 1858, December 15.—Nº 2870.

VIELLARD-MIGEON, François, Christophe, Nicolas, Juvenal.—This invention consists of four machines separately performing one of the several operations required in the manufacture of wood screws, the first of the said machines, called the heading machine, being also capable of making rivets, nails, spikes, and similar articles from metallic wire. The second machine is adapted for turning the heads of screws, the third for nicking the heads, and the fourth machine for cutting the threads. There is also an apparatus, adapted respectively to the three last machines for feeding the blanks, comprising a hopper for holding the blanks or partly finished screws, the shanks of which falling through a narrow slit in the bottom of the hopper, become suspended by the head, which remains inside. Thence the blanks are taken by an endless chain furnished with pegs, which enter the slit and move the blanks in succession down inclines to be received by the operating parts of the machines.

The heading machine upsets the wire and moulds the screw head in two operations by means of a pair of vertical moving pincers, which carry two pairs of gripping dies, for respectively co-operating with two heading punches. The wire out of which the screw blanks are to be made, is fed into the machine by a common feeder through a steel plug from a reel, the end being received by the upper pair of gripper dies, which moving downwards, cut off the required length for a screw blank and present it endwise to a flat heading punch, which upsets the wire and by forcing it into a recess in the dies partly forms the head. The blank is then held while the dies open and move upwards for the next piece of wire, at the same moment that the lower dies seize the half-formed blank, and descending present it to a second heading punch, which moulds the head to its rough finished shape. Thence the blanks are fed into the hopper of—

The turning machine, the end of the revolving shaft of which is furnished with a pair of pincers, which seize the blanks by turns and hold them whilst the cutting tool, which is appropriately shaped to form the finished head, is advanced by a cam; after this operation the pincers are caused to open to release the blank and close upon the next, which then is presented by the feeding apparatus: thence the blanks are taken to the—

Nicking machine, in which they are in succession held by a pair of vibrating pincers, whilst the heads are nicked by a circular saw, the next operation being performed by the—

Cutting or threading machine, which operates by means of a cutting tool that traverses the blank lengthwise, cutting from the neck of the screw to the point, the latter revolving at a high speed, the cutter returning and repeating the cuts until the proper depth is attained, when the finished screw is released by the opening of the pincers, which then close upon the next.

[Printed, 5*s*. 8*d*. Drawings.]

A.D. 1858, December 16.—Nº 2882.

STOKES, ABEL, and STOKES, FREDERICK JOSEPH.—The object of this invention, which is adapted to lathes and machines employed in turning and worming screws, is to make such lathes and machines to a certain extent self-acting, so as to effect the opening and closing of the dies and cutters, and at the proper time, throw the lathe out of gear with the driving power. "A " horizontal shaft, driven from the main shaft of the lathe, carries " a camb, which said camb on each rotation of the shaft depresses " a vertical rod jointed to one end of a lever; the other end of " the said lever carries a vertical rod, which acts upon the parallel " joint of the dies or cutters. By the operation of the said camb " the weight is raised, by which the dies or cutters are closed, " and the said dies or cutters open by the operation of a spring. " The said horizontal shaft carries a second camb, which, as the " shaft rotates, depresses a rack; the said rack operates upon a " ratchet wheel communicating to it and its axis an intermitting " rotatory motion. This intermittent motion is transmitted by a " pinion on the last-mentioned shaft to a vertical rack, which is " thus made slowly to descend. When the said rack has " descended to the proper distance a wedge which it carries acts " on a slide, which throws the driving band from the fixed to a " loose pulley, and brings the machine to rest. The machine is " thrown into gear again by the attendant. By means of connecting rods the mechanism described may be made to operate " simultaneously upon several lathes. By applying an additional " or second rest, in which dies or cutters are fixed, a self-boring " or pointed screw may be produced at the same time as the " thread or worm is being formed; or the point may be formed " either before or after the worm."

[Printed, 8*d*. Drawing.]

A.D. 1858, December 24.—Nº 2943. (* *)

OWEN, LEMUEL DOW. — (*A communication.*) — (*Provisional protection only.*)—Machine for manufacturing horse-shoe nails.

On the main shaft is fitted a self-adjusting excentric, having a chilled roller or a roller of hardened steel attached. On each revolution of the shaft, the hardened roller strikes or hammers the nail rod or iron a drawing or sliding blow, from the head towards the point, such rod having been passed in a red-hot state between two dies; and before the roller makes another revolution to give another such blow, one of the dies (which is movable by means of an excentric) strikes or hammers such nail sideways, the other die, which is fixed, acting as a block or anvil. The shaft may be made to move backwards and forwards. The nail rod passes through a holder which has "a kind of jigger motion" to prevent scales forming on the nail rod. The required length of rod is gauged by a spring attached to the holder, and the holder and nail rod may be drawn back by cams. When the nail is formed it is cut off and finished.

It is stated that the details may be varied.

[Printed, 4*d*. No Drawings.]

A.D. 1858, December 29.—N° 2981. (* *)

GOWING, THOMAS WILLIAM.—(*Provisional protection only.*)—"An improved roughing for the shoes of horses and other like "animals.

The improved "roughing consists of nails formed with spikes "or projecting surfaces, and with a shoulder which bears upon "the outside or bottom of the shoe itself. In other respects the "nails are similar to those now in use."

[Printed, 4*d*. No Drawings.]

1859.

A.D. 1859, January 1.—N° 14. (* *)

WIGZELL, MONTAGUE.—"An improved form of nail or driving "article." "The improvement is chiefly in the form which will "give strength and enable them to be made much lighter, and "cause the nail or other driving article to revolve whilst being "driven home, making it unnecessary for any hole to be pre"viously made, and will cause it to offer a much greater resistance "than any other article of the kind. They are to be twisted or "made in a spiral or screw form, either fluted or plain, of any "shape, size, or thickness, either sharp or blunt, and to be made

" whilst hot or cold in any kind of metal, by being rolled, cut, " stamped, cast, forged, pressed, turned, or by any other method " by which they can be produced."

[Printed, 8*d*. Drawing.]

A.D. 1859, January 6.—N° 48.

ASPINALL, John.—The object of this invention is to improve the construction and mode of working machines adapted for manufacturing bolts, rivets, and spikes, the heads on such articles being formed by a blow, or a succession of blows, and not by pressure.

To this end the subordinate operating parts of the machine obtain motion from the ordinary motive power, but the punches, which form the heads on the bolts and articles, are directly acted upon by the blows of a steam hammer, the steam valve of which is actuated by an eccentric cam fixed on a shaft revolving in concert with the mechanism. The machine comprises a resisting bed block and an intermittently revolving disc, having a circumposed series of apertures wherein the dies, suited to the nature of the work, are placed, the apertures corresponding at intervals with the feeding holes, which are formed in the resisting block or bed. The punching tools or dies are disposed in punch boxes, two or more of which are so placed as directly to cover and correspond with two or more adjacent dies during the stopping intervals of the revolving disc. The face of the piston or hammer block is of sufficient size to cover and strike once or twice the two or more punches, and during the interval the disc is moved round by a pawl one division, so that as the bolt pieces in succession having been struck by the first punch, are by turns brought directly beneath the second which, if a third punch is not employed, finishes the operation, the ends of the bolt rods being fed into the dies in the disc through the holes in the bed plate and are successively cut off at each movement of the disc.

[Printed, 1*s*. Drawings.]

A.D. 1859, January 29.—N° 265.

LANE, Josiah.—This is an invention of two machines, one adapted for forming, by means of cutting dies, the threads on bolts and screws, and the other for tapping screw threads in nuts. A circumposed series of dies, suitable for cutting screw threads, is carried by a horizontal table, which is free to revolve on a vertical axis, the axis, independent of the table, being caused to rotate by bevel gearing actuated by the motive power. Each die receives independent rotary motion from the vertical axis, and this motion is capable of reversal by means of clutches, in order that after the bolts or screws, which are presented to the dies in a vertical position, have been drawn therein and the threads cut upon them, they may be released again by the unscrewing of the dies. The table is caused to revolve by the resistance of the dies whilst cutting, and the rotation of the dies is stopped as they come round to the point for feeding, which is performed by the workman, the thread on the screw or bolt being finished during one rotation of the table.

The machine for tapping nuts contains a circumposed arrangement of vertical revolving spindles, each spindle at its lower end being fitted to receive a tap. The nuts are carried on a horizontal table beneath, the essential novelty consisting " in fixing the nuts " while they are being tapped on a revolving table, by which " they are fed into and readily removed from the machine."

Both machines are provided with a soap water cistern and arrangements for lubricating and cooling the taps and dies.

[Printed, 10*d*. Drawings.]

A.D. 1859, February 12.—N° 396.

MOATE, Charles Robert.—(*A communication from Joseph Gibbs.*)—(*Provisional protection only.*)—This invention relates, first, to the manufacture of nuts, screw bolts, spikes, and other headed fastenings, and second, to casting nuts and the heads on bolts, spikes, and similar articles.

1st. Consists in making an enlargement or burr on the end of the bolt or spike shank, by upsetting the metal as a preparation for the perfect head, which is to be afterwards cast on in the usual way of casting metal, the shanks being placed in moulds prepared from perfectly formed pattern bolts or spikes, cavities being thereby left round the heads to receive the cast metal, which in cooling shrinks and becomes firmly attached to the burr. Nuts are cast round short lengths of wrought-iron tube corresponding to the intended thickness of the nut, the cast metal partly fuses and adheres to the tube, inside which the screw thread is afterwards cut.

2nd. Relates to the preparation of moulds for casting the heads on bolts and spikes, and for casting nuts. These moulds are made out of slabs or plates of dried loam, and the indentations or recesses for receiving the shanks and the cavities for casting the heads or for casting nuts round short pieces of wrought-iron tube, are to be worked out by machinery.

[Printed, *4d.* No Drawings.]

A.D. 1859, February 16.—N° 439.

BREEDEN, JOSEPH.—This invention relates to divers machines, severally adapted to perform one or more of the processes required in the manufacture of taps or stop-cocks, pipes, and gas fittings, requiring swing joints, universal swivel joints, union joints, bracket backs, swing pendent tops, etc. These machines comprise,—

A machine for making screw blanks for the screws employed. "The wire to be made into blanks passes through the hollow "axis of a lathe, being urged forward by a propelling wire and "weighted cord. A guide stop determines the point to which "the wire shall advance. The wire is gripped by an apparatus "actuated by a weighted lever, and liberated by pressure of the "foot upon a pedal. Or the gripping may be done by the foot, "and the liberation by the weighted lever. The turning tool is "advanced by means of a lever against the end of the rotating "wire, and turning off a portion of the said wire forms the body "and head of the screw. A second cutter advancing, cuts off "the screw blank from the wire."

A "machine for screwing screw blanks and tapping the holes "in the plugs of stop-cocks is constructed as follows:—A rod "having a rack at its lower part has an alternating motion given "to it by means of a cam operating upon its tap end. The rack "engaging in a pinion gives thereto a rotatory motion. On "one side of the pinion is a screw plate by which the screw "blanks may be tapped, and on the other side of the pinion is a "screw tap by which the holes in the plugs are tapped."

A "machine for slitting or slotting the screws or screw blanks "is constructed as follows:—The screws or screw blanks are "fixed in a row in a clamp or holder, which is moved by a lever "along a dovetail slide under a circular saw, which, by its rotation, cuts the slits or slots in the heads of the screws or screw "blanks."

A machine for turning washers. The cutters are fixed on the lower end of a rotating vertical spindle, and the washer is held on the top of an upright bolt, which slides up and down in guides beneath the spindle, and in a direct vertical line therewith. As the bolt is caused to rise gradually by the action of the machinery, the washer is raised into contact with the cutters, which are shaped and set to operate at the required angle.

A machine for making the plugs of taps and stop-cocks.

A machine for squaring the ends of plugs.

A machine for cutting the recess which limits the action of the stop peg in the top of the barrel of a tap or stop-cock.

An arrangement of pedal apparatus for changing the speed of driving machinery.

[Printed, 2*s*. 4*d*. Drawings.]

A.D. 1859, February 28.—N° 526.

HOWDEN, James.—This invention relates to machines adapted for making rivets and bolts, which machines operate by means of horizontal die holders, intermittently revolving about vertical axes, and respectively mounted on circular beds.

Two of these machines are described, one containing two of these rotating die holders, and the other four, each die holder containing a circumposed series of dies. Fitted with each die holder in a position to co-operate with all its dies in succession, is a heading ram, which carries in its lower end a heading punch or die. Every divisional rotative movement of each die holder brings a supply of fresh rivet or bolt pieces contained in the dies by turns to be headed and shaped beneath its respective descending ram, and as the latter ascends, the die holder is by means of a ratchet and pawl moved a portion of a revolution, so as to bring the next die in succession beneath the ram, whilst the headed bolts or rivets are carried round by the die holder, and at one of its stopping intervals are, by means of a spindle, pushed upwards out of the dies. The metal rods are cut up into short pieces the requisite length by cutters operating at the side of the machine, and as the empty dies by turns come round, fresh bolt or rivet pieces are placed in them by the attendant. The machines, by substituting dies of other form, or apparatus suitable for the purpose, may be employed for punching, shearing, shaping, and compressing.

Describes a "facing up and boring tool," which is to be fixed to the vertical spindle of either of the die holder tables, when its application is required for boring or facing up the dies.

[Printed, 1*s*. Drawing.]

A.D. 1859, March 14.—N° 640.

WALLER, Richard.—This invention relating to the manufacture of boots and shoes, consists in a mode of fixing the soles to the upper leathers, and to uniting substances by means of wire pegs, or brads and rivets, which are placed in perforated guiding plates, and instead of being forced according to the usual mode, one at a time into the boot or shoe sole, they are forced in simultaneously by means of a press and other necessary appliances. The surface of the wire employed is indented or roughened and taken from a series of bobbins. The wire off each bobbin passes through one of a series of tubes into a series of holes in a guide plate, and thence through into another guide or rivet plate, the circuitous line or lines of perforations in the two plates having the configuration of a boot or shoe sole, the holes in each exactly coinciding. A circular saw or cutter is then passed between the two plates, and by it the ends of all the wires which are in the rivet plate, are cut off. The boot sole having been perforated by a corresponding circuitous series of awls is placed in exact position beneath the lower or rivet plate, and all the pegs are simultaneously pushed down by a driving block that is furnished with a corresponding circuitous line of forcing pins, which severally enter the holes in the rivet plate, and driving all the pins out, simultaneously force them into the sole.

Instead of wire pins, brads and rivets in some cases are used for fixing or rivetting the soles to the upper leathers; these brads and rivets are cut by an apparatus, which is similar to a brad cutting machine, and is combined with the shoe making machinery. As the brads are cut off they fall into a series of small guiding tubes, which are fixed side by side to a flexible foundation capable of being folded to the shape of the rivet guide plate, into the holes of which they are severally pushed, and thence forced into the soles. The full details of the process are described.

[Printed, 1*s*. Drawing.]

A.D 1859, March 16.—N° 664.

AVERY, William.—This invention, relating to the manufacture of screws, consists of an apparatus for feeding the screw blanks into the machines respectively employed for turning the heads, for nicking the heads, and for worming the shanks, the mechanical arrangements of the apparatus, according to its adaptation, requiring to be modified.

"A number of blanks, that is, plain spindles with heads, is " placed in a hopper leading into a spout or open guide; as soon " as the blanks reach a given point, an instrument I term a separator comes into action, and separates one blank from the rest; " the blank so separated falls or is deposited upon a feed rod; " a spring catch takes hold of the back of the blank, and as the " feed rod is moved forward the spring connected to the catch " also presses the blank forward, and at the end of the stroke of " the feed rod delivers the blank into and between the clamps, " to be by them held while being threaded. Or instead of the " feed rod, I cause the blank to be received between a pair of " holders; a piston then drives the blanck forward, either head " or point first, as may be desired, and delivers it into and between " the clamps."

In regard to the arrangements for the nick cutting machine, " the screws or blanks are led through a guide rod, and when " they reach a given point a separator divides one off from the " rest; the piece so separated falls between a pair of holding jaws " in a proper position for being acted upon by a rotary saw, which " cuts the required slot or nick, the jaws then rise and a wedge " entering between them, separates them, and at the same time " knocks out the slotted screw or blank head. Another wedge " further opens the jaws to enable them to receive a fresh blank " or screw, when the motions are repeated as before described."

[Printed, 10*d*. Drawing.]

A.D. 1859, April 2.—N° 834.

WILLIAMS, THOMAS, and FULLER, JOHN HOBSON.—This invention has for its object "improvements in screw-stocks and " dies." The stocks first described are fitted to receive two square die blocks which are set up by means of a screw. These die blocks are capable of cutting four screws of different sizes or pitch, a different pair of cutting dies being formed at each of the four sides or angles, so that according to the size or pitch of the screw required within the capacity of the four pairs of dies, the blocks only require to be shifted round to bring the two corresponding sides into conjunction and then to be set up by the screw for action, the die blocks being made secure in the stocks by a side plate.

A die stock containing three dies which are set up by wedges is described and illustrated. This stock has its side plate hinged to it, the plate being fixed by a screw at its free end.

Describes another stock which is fitted to receive two square die blocks capable of cutting screws at two opposite sides; these dies are set up by the combined action of a screw and wedge.

[Printed, 6*d*. Drawing.]

A.D. 1859, April 23.—N° 1,019.

DICKS, William, and HOPWELL, William.—This is an invention of machinery adapted for "making screws and applying "them in fixing the soles of boots and shoes." The wire or metal rod out of which the screws are made is fed into the apparatus through a revolving tube, which is furnished at one end with the gearing that gives it motion, and at the other end with a plate piece, which carries a pair of nipping rollers respectively grooved round the periphery, and which together with the rollers revolves with the tube, the wire passing thence direct into the dies, which are fixed to a rigid part of the machine in a line with the axis of the tube. As the revolving wire passes through the dies, it is screw threaded, and being gradually drawn through the rollers as it screws through the dies, it enters the sole of the boot or shoe, which is placed on a platform support beneath. When a sufficient length of the screwed end of the wire has entered the sole, it is cut off flush therewith by a sliding cutter, pending which operation, the rotations of the tube, and consequently the rollers and wire cease. The sole is then shifted into a fresh position to receive the next insertion of the screwed end of the wire, which is again cut off, and the operation is continued until the required number of screws have been inserted in the sole.

[Printed, 10*d*. Drawing.]

A.D. 1859, April 27.—N° 1,053.

PEARSON, George.—This invention relates to apparatus adapted for cutting and shaping pieces of wood for treenails. It comprises a frame, whereon are mounted, parallel with each other, three horizontal spindles respectively carrying driving pulleys, which are caused to revolve at the required speed by straps or bands. The spindle ends carry chuck flanges, to which in the case of two of the spindles are attached cylindrical cutter boxes furnished with cutting blades, and the third spindle carries a circular saw. One of the cutter boxes shapes the parallel stem of the treenail and the other forms a conical enlargement which answers for the head. The pieces of wood are prepared in lengths, each sufficient to make two treenails joined heads together, which are afterwards separated by a transverse cut of the circular saw. First one end and then the other of the pieces of wood in succession are thrust by the attendant a regulated distance into the box which forms the parallel stems, and thence into the box which forms base to base the double conical enlargement for the two heads, the cutter boxes revolving at the necessary speed. The piece thus shaped is then laid on a rest or frame, which at its lower end vibrates on a fixed cutter, so that the shaped pieces secure from lateral movement are advanced direct to the edge of the saw.

[Printed, 8*d*. Drawing.]

A.D. 1859, May 3.—N° 1109.

SELLERS, William.—This invention has for its object improvements in machinery for making or cutting screw threads on bolts and in nuts, whereby the necessity for reversing the motion of the cutting dies is avoided, and the dies and tap holder are arranged with a view to afford greater facility in changing from one sized thread to another, the same kind of machine being capable with modifications of cutting both bolts and nuts. The main spindle, which carries on its front end the die holder, is hollow, and free to revolve in another tubular spindle, on the front end of which the face plate, which carries three segmental pieces having the form internally of paracentric curves, is fixed. These eccentric inclines cause three dies, which are fitted to slide in radial slots in the die holder, to converge simultaneously and close upon the bolts upon which they are about to operate.

When the dies are cutting, both spindles revolve together, but when the thread on the bolt is finished, by means of a friction clutch differential speed is given to the two spur wheels which respectively actuate the hollow spindles, and by this means the pressure on the dies by the segmental curves is relaxed, the dies by means of springs diverge and the bolt is set free.

"The cutting edge of the dies may be formed so as to cut a full "thread by once passing over the bolt; this is accomplished by "first cutting a thread in the dies perfectly straight and cylindrical, and of such size as to fit the bolt when it has the thread "cut upon it. The tops of the threads in the dies are then "dressed off, commencing at the base of the thread where the "bolt is entered, and terminating at the top of the thread about "four threads from the point of entrance; they are at the same "time to be dressed back from the cutting edge so as to give "a clearance. Each thread of the dies will thus form a cutting "edge, and the thread upon the bolt will be formed by a series of "cuts, each one deeper than its predecessor, until the perfect thread is developed."

[Printed, 10*d*. Drawings.]

A.D. 1859, May 25.—N° 1295.

NEWTON, Alfred Vincent.—(*A communication from Charles Bartholomew Allen.*)—This is an invention of a machine which, by a rolling process, is designed for forging, compressing, and shaping rivets, bullets, and other articles. In the machine are mounted, relatively in trigonal position, three shafts, two being disposed on a horizontal plane and the third intermediately above them; at one end these shafts are geared together by tooth pinions, and they revolve in stationary bearings suitably formed in an upright head stock. The other ends of the three shafts pass through and are carried by blocks, which slide respectively in three grooves relatively radiating from a common centre, and formed in another headstock similarly disposed at the opposite end of the machine. By means of a double conical enlargement or incline on each shaft, and a reciprocating yoke which circumvests the three shafts and carries small rollers in contact with the double conical enlargements or inclines, these ends of the shafts which carry the forming rollers are caused simultaneously to approach or recede from each other, the fixed bearings which carry the other ends of the shafts being suitably constructed to permit it. The "formers" or short rollers which give to the rivet or article the required shape, have their peripheries furnished with the necessary swaging grooves. The end of the rod out of which the articles are to be made is in a heated state fed through a rest or guide and pushed between the rollers or "formers" whilst they are apart in the direction of their length up to an adjustable gauge, and as the rollers close (revolving at the same time) they gradually compress the end of the rod and give it the required shape, the friction of the forming rollers causing the rod to revolve. When the rollers open the rod is withdrawn, and the finished rivet is cut off by a cutter in conjunction with the front edge of one of the rollers, between which the end of the rod is again fed, and the operation repeated.

[Printed, 1*s.* 2*d.* Drawings.]

A.D. 1859, June 21.—Nº 1494.

OWEN, LEMUEL DOW.—(*A communication from Messrs. Buck and Company.*)—This invention, relating to "machinery for manufacturing bolts and nails," which machinery operates upon the heated nail rod with a kind of sliding blow, having the effect of striking and drawing the metal simultaneously. The operating parts and action of the machine, which is constructed with a suitable frame supporting the main shaft, is described as follows:— "On that shaft I have an eccentric, which may be made self-adjusting, and to such eccentric I attach a chilled roller or roller of hardened steel or other suitable material. On each revolution of the shaft, the hardened roller is made to hammer or strike the nail rod or iron a drawing or sliding blow from the head towards the point, such nail rod or iron having been passed in a red hot state between the two dies, and before the roller has made another revolution to give another of such blows, one of the dies which is moveable is, by means of an eccentric or cam, caused to strike or hammer such nail sideways or horizontally, the other die, which is fixed, acting as a block or anvil for the purpose; the shaft may, if desired, be arranged to move forewards and backwards, or to be stationary. The nail rod or iron is made to pass through a holder which has a kind of jigger or vibratory motion to prevent scales forming on the nail rod or iron, and I guage the required length of nail rod or iron by means of a spring or other suitable contrivance attached to or connected with such holder. The holder, and nail rod or iron is then drawn back by means of cams or other convenient arrangement, and when the nail is formed it is cut off and finished at each end if necessary. In some cases I make both the dies moveable, and in some cases, instead of employing the eccentric and roller as before mentioned, I ar-

"range a hammer in such a way as to give the drawing or sliding "blow required."

[Printed, 2*s.* 4*d.* Drawings.]

A.D. 1859, June 22.—N° 1501.

CLARINI, Charles.—This invention relates to "machinery by "which wrought metal nails of various patterns are cheaply and "rapidly made." The machine operates by means of two side hammers and one top hammer acting in conjunction with a vibrating anvil, which is grooved to receive the nail rods, and accepts the blows of the side hammers at the moment when at the extreme end of its action in either direction it momentarily rests whilst its motion is being reversed, the side hammers actuated by eccentric cams, striking laterally at the opposite sides of a projection on the anvil, and the top hammer which strikes on its horizontal surface, being mounted loose upon its end centre, is actuated by the jaws of a forked arm which embrace the hammer shank.

The nail rod may be either fed by hand or by the machine, each length taken off by a cutter being regulated by a gauge.

[Printed, 10*d.* Drawings.]

A.D. 1859, June 23.—N° 1507.

MENNONS, Marc Antoine François.—*(A communication from J. L. Vergniais.)*—This invention relates to a machine for making bolts and rivets, operating by means of an intermittently revolving circular plate which has an arrangement of orifices formed to receive a series of dies or matrices severally circumposed at corresponding radial and segmental distances, so as whilst the plate is at rest, the several dies shall in succession be brought into conjunction with a heading punch or header, which strikes and forms heads on the pieces of metal rods as they in succession are brought round in the dies. The end of the metal rod which is taken from a contiguous furnace at a red heat, is passed through a guide piece and every stopping interval of the die plate, is thrust in succession into that die which for the time being is coincident with the guide, and being cut off by a pair of cutters, is brought in turn by the movement of the die plate into coincidence with the header, which upsets the end of the metal and moulds the head upon the bolt or rivet, which then, passing on with the plate, is on arriving at a certain point in the revolution, by means of a suitable instrument, pushed out of the die. In this way the operation is successively carried on by the machine, constant feeding into the empty dies and cutting off at the first point, constant heading the pieces as they come round in the dies at the second point, and constantly pushing them out of the dies at the third, the overheating of the operating parts being prevented by the flow of cold water.

[Printed, 8*d*. Drawing.]

A.D. 1859, July 4.—N° 1591. (* *)

BROOMAN, Richard Archibald.—(*A communication from Job Johnson.*)—Powder or mixture for refining and steelifying iron. According to this invention, take quick or caustic lime, free from earthy or foreign substances, and add to it an equal quantity of bone dust or baked bones finely divided, and a like quantity of charcoal, oak preferred; mix these ingredients intimately, and expose them to the influence of the weather for one, two, or more days; then, in any convenient form of cementing or converting furnace, interstratify the articles of iron to be operated upon with the mixture till the furnace is charged; afterwards close and lute with fire-clay, and apply heat externally. "By this "means and process I am enabled to give to iron entirely new "properties and qualities, as well as to convert or partially con"vert it into steel at pleasure. Iron, subjected to this treatment, "assumes great rigidity and hardness without losing its property "of malleability and ductility." Amongst other articles, rivets "may be finished in iron, and then converted, or partially con"verted, into steel, without impairing their forms or requiring "reconstruction."

[Printed, 4*d*. No Drawings.]

A.D. 1859, August 1.—N° 1774.

CAMPBELL, William, and WORSTENHOLM, George.—(*Partly a communication from George William Allen*;)—This invention relates to machinery adapted to the manufacture of wrought iron cut nails, and to the treatment of or preparation of nail iron, the object being as regards the mechanism, to avoid derangements and breakdowns by more perfect arrangements of the frame work and the means adopted for adjusting the position and movements of the operating parts, so as to adapt the machines to the production of nails of various sizes, and also by a vibrative action of the back die, to insure the clearance of the nails in succession from the dies after every operation of the machine, which may be constructed either with a single or double action. The preparation of iron for the purpose of nail making, consists in the mode of rolling the metal between longitudinally grooved rollers, so as to produce sheets with a regular series of transverse ridges on one or both sides, the sheets being afterwards cut up transversely into strips or bands severally carrying a portion of a ridge along each edge. The machine cuts the nails crosswise from the end of these strips, partially forming the head of each nail in succession alternately from the ridges on the opposite sides of the narrow plate or strip, the cut pieces or blanks being received from the cutters, are moulded to the required form between suitable dies or forming tools, which spread the metal laterally and do not cause its elongation, other tools coming into operation to shape and finish the partially formed heads.

The invention is carefully described and illustrated in detail and it is stated that the primitive machine to which these improvements are applied was originally the invention of Mr. Ezra Jenks Coates.

[Printed, 3*s*. 4*d*. Drawings.]

A.D. 1859, August 26.—N° 1948.

MACLELLAN, WALTER.—(*Provisional protection only*.)—"This "invention relates principally to the rolling or shaping of bar "iron for the manufacture of railway spikes or the fastenings "employed for holding down the chairs of permanent way, but "it is also applicable to the manufacture or production of other "articles. It consists essentially in the so shaping the rolls, that "the bar iron out of which the spikes are to be made, that the "bars are rolled in them with alternate round and square sections. "For this purpose the rolls are cut or grooved on their peripheries "angularly and curvilinearly in alternating sections, the relative "length of the sections being proportioned to the sizes of the "articles to be produced. In this way, when the bars are cut up "into spike lengths, all that is further necessary is to form the "spike heads. In this way railway spikes with round or cylin- "drical necks, and square or angular body portions, are made

" with great facility and accuracy, the rectangular portion being " subsequently twisted for giving it an effective hold. Rolls with " grooves of various forms may be used according to the trans-" verse sections which may be required. Pins for other purposes " and articles of other and different kinds may be made in the " same way, the essential object of the invention being the rolling " of iron in alternating lengths of different transverse sections in " the same or one pair of rolls."

[Printed, 4*d*. No Drawings.]

A.D. 1859, August 31.—Nº 1983.

MIDDLETON, SAMUEL.—This invention relates to the making of fastenings to be used for uniting and manufacturing articles of leather and such like materials, and to the apparatus employed. Instead of employing for the purpose short metal pegs tapering from a central shoulder, as described in the specification of prior letters patent, granted to this inventor and bearing date February, 25, 1858, No. 378.

According to the present invention, the pegs employed have a slotted opening cut through them similar to the eye of a darning needle, and pointed either at one or both ends; in transverse section they are of various forms, and amongst them the bayonet shape is preferred, with or without barbs, their holding power being due to the eyes or transverse slotted openings. Some of these fastenings as exhibited in the drawing are pointed only at one end, some have heads, and others consist of two pieces fastened together. They may be cut by dies or revolving cutters from flattened or other shaped brass or other metal wire, or from plates, and they may have lateral indendations. One of the chief purposes to which it is proposed to apply them is the fastening of soles to boots and shoes.

[Printed, 8*d*. Drawing.]

A.D. 1859, September 9.—Nº 2062.

GEDGE, WILLIAM EDWARD.—(*A communication from Bernard Roelandt and Company.*)—This invention, relating to the manufacture of nails called "Paris points," has for its object the rendering such nails less liable to split, bend, or break in the using. To this end, the wire or the rods from which the nails are manufactured, are first scoured or pickled in muriatic acid, then subjected to a laminating process, which consists in passing them twice between rollers so as at each pass to alter the transverse section, leaving them ultimately round and rigid, and they are afterwards passed through or into an oven, and thereby brought to the required state of malleability, fit for making nails. The machine employed is not particularly described, the operating parts being a hammer or punch worked by a crank for forming the heads, presses for shaping, and cutters for separating the nails from the rods.

[Printed, 10*d*. Drawing.]

A.D. 1859, September 13.—N° 2084.

ADAMS, William Bridges.—This invention relating to the manufacture of the constructional details employed in forming the permanent way of railways, consists :—

1st. In spikes or screw-bolts adapted for holding chairs to sleepers. The holes in the chair are made large and conical, and the neck of the spike or screw, which may be conical or cylindrical, is finished with a loose metal collar, either coned or flat. When the spike is driven down, the collar becomes bedded and forms a packing in the hole, which is filled without the risk of splitting the chair.

2nd. Employs angle keys of tempered steel or iron instead of wood for fixing the rails in the chairs. These keys may be used on one or both sides; they hold the rail by elastic pressure, being bent to an angle, the back pressing against the chair, and the two edges fitting and pressing in the hollow corners of the rail. A variety of these keys are described and illustrated.

3rd. Relates to double headed girder rails made with side flanges to bear upon the ballast, no timber sleepers being required. Also to modes of joining various kinds of rails, metal and wood discontinuous sleepers, ties, casting rails, and elastic bearings.

4th. Key-bolts, which are used diagonally for fixing the wooden brackets that support the rails on cross sleepers of T iron.

5th. Twisted key bolts and fish and bracket bolts; these bolts cannot turn in the holes in the act of screwing up, and the nuts will not loosen when screwed up by reason of their being held in elastic tension. Also the use and application of light curved fishes secured upon a packing of wood.

[Printed, 2*s*. 6*d*. Drawings.]

A.D. 1859, September 27.—N° 2185.

PARFITT, John Spalding.—This is an invention of a machine devised for heading, whilst in a heated state bolts, rivets, screws, and similar articles. "Pieces of iron of the proper size for " the bolts or rivets are cut off to the required length by any " machine or process," and "put into a hopper grooved in the " lower part . . . . . . The ends of the hopper are perforated " or cut open on one side in the direction and opposite the " groove, in order to give a free passage to the pieces of iron " which are pushed out" one at a time "by a rod actuated by " a special organ of the machine. One end of the said pieces of " iron as they issue from the hopper enters a moveable cast-iron " round furnace, which has an intermittent revolving motion on " its axis. Small apertures are cut around the periphery of the " said furnace, and each aperture stops in its turn to allow the " pieces of iron from the hopper to enter it. Fixed on the " outside of the furnace, opposite to every aperture, are small " spring pincers which hold the pieces of iron while the furnace " is moving round. The furnace is supplied within with charcoal " or any other kind of fuel, and the fire is kept up either by " bellows or by any other blowing apparatus, the tuyer of which " enters the centre of the shaft on which the furnace revolves. " When the pieces of iron which are carried round by the furnace " have travelled a whole revolution, the portion of them which is " in the burning coal being heated to a suitable degree, they " are seized by a pair of pincers which bring them between dies " carried by sliding jaws lodged in the head or stoutest part of " the frame of the machine. The jaws are closed by cam-formed " levers, so as to hold firmly the end of the piece of iron, which " receives a first pressure from a punch, which gives it a preparatory shape. This first punch is carried by a ram, which also " carries a second one placed below the first one. A crank of the " main shaft actuates the ram, giving it a horizontal forward and " back motion, and this produces the successive stamping of the " head by both stamps, whilst another crank of a lower shaft raises " and lowers alternately the end of the ram carrying the punches, " in order to bring them opposite to the red hot iron which they " are to stamp. During this time the furnace having moved the " piece of iron which was carried away is replaced by a fresh piece " from the hopper, and the pincers which carried the first piece

" between the dies having moved back, take hold of another " piece and carry it between the same dies, which open to receive " it, the finished bolt or rivet being knocked out by a small lever, " which causes it to fall under the machine."

[Printed, 2*s.* 4*d.* Drawings.]

A.D. 1859, October 1.—N° 2228. (* *)

STOCKER, ALEXANDER SOUTHWOOD.—"Improvements in the " manufacture of articles to be affixed to boots and shoes, and to " the feet of animals."

The "invention relates to an improved mode or method of " making shoe heels and toes, horse and other shoes for the feet " of animals, chain links, and washers of iron or other metal, " and consists in the employment for that purpose of a metal " die having the counterpart of the article intended to be produced cast or otherwise formed in or upon one or more of its " surfaces. In the manufacture of metal shoe heels, this die has " projections formed upon it for the purpose of producing the " indentations in the heel intended for receiving the nail heads, " and it is also formed in such a manner as to impart the desired " shape to the partly manufactured article which it is intended to " complete. The metal of which the shoe heel is to be composed " having been previously prepared and partially shaped by hand " or otherwise, is placed in or over the matrix or sunken part of " the die, and is then subjected to the pressure of a roller or " rollers, which are made to revolve by any suitable means, and " under or between which the die with the metal to be shaped " placed upon or in it is passed; or in lieu of rollers or other " suitable mechanical contrivances may be employed for exerting " a steady and gradual pressure upon the article in or upon the " die."

[Printed, 6*d.* Drawing.]

A.D. 1859, October 4.—N° 2250.

COOK, THOMAS.—This invention relates to the construction of two hand-tools, respectively for forming the blanks, cutting the threads, and forming the heads on screws, the wire out of which such screws are formed being projected from the chuck of a lathe, and revolving therewith. Each tool is furnished with a socket guide. The first tool by means of a cutter reduces the wire a certain length corresponding to the desired length of the screw, to the required size from the end along the blank up to and forming the shoulder beneath the head, by means of a cutter, the end of the wire revolving in the socket guide. The tool is gradually pressed by the hand of the workman on to the wire in the direction of its length, the cutter acting at the side as in an ordinary slide lathe. When the end of the wire reaches a length gauge in the tool, the latter is withdrawn, and the socket of the second tool is slid upon the blank. This tool carries a cutter for forming the top of the head, and a pair of threading dies for cutting the screw. The dies are held together by a pair of levers and a catch, which when sufficient length of thread is cut is disengaged, and the dies opened by a spring. The tool is then pressed towards the head of the screw, and by means of a duplex handle the cutter is brought into operation, turning or surfacing the top of the head, and finally cutting off the finished screw.

[Printed, 10*d*. Drawings.]

A.D. 1859, October 15.—N° 2351.

LEIGH, Frederick Allen.—(*A communication from Richard Hartmann.*)—This invention relates to machinery for manufacturing screws, bolts, and nuts. The machine first described is adapted to the shaping of the hexagonal heads of screw bolts after they have been centered and turned in a duplex sliding lathe, the chief novelty consisting in the adaptation to the machine of an elastic split socket or bolt holder internally conical, combined with several arrangements of self-acting machinery, employing ordinary cutting tools appropriately shaped to form the surfaces and angles on nuts and bolt heads.

"The bolt of the intended screw is placed in an elastic tube " or socket with a tapered head on the exterior, which taper fits " a corresponding part of another tube furnished with a dividing " plate, and capable of turning in a table working on a slide. " The elastic socket is bored at its fore part of the diameter " of the screw, and holds the latter firm when the taper part of " the socket is drawn by a screw and nut into the taper part of " the tube which supports it, a pin or catch being employed to " enable both tubes to turn together. The elastic tube or socket " is provided with a six-sided head a little smaller than the " required shape of the head of the screw, for the purpose of " regulating the position of the cutting tool, and also the posi-

"tion of the screw head against the dividing plate. When the "screw is fixed, one side of the head is shaped by sliding the "table, then the catch is turned so as to move the dividing plate, "and the next division of the head is shaped, and so on, until "all are finished, when the elastic tube or socket is loosened "from its holder, and another bolt supplied for a fresh operation. "When the heads are shaped the bolts are screwed in a screw-"cutting lathe especially adapted for the purpose."

When the machine is employed for shaping hexagonal nuts, a bolt or mandril screwed to enter and hold the nut is placed in the elastic socket.

Eleven sheets of drawings exhibiting the machinery in detail are attached to this specification.

[Printed, 5*s.* 6*d.* Drawings.]

A.D. 1859, October 18.—N° 2377.

REYNOLDS, JOSEPH.—(*A communication from Henry Coggshall.*)—This invention, relating to the manufacture of nails, has for its object the more perfect formation and developement of the heads of such nails as are cut tapering in form from metal plates, by machines having cutters and dies arranged to grip and press the cut off pieces into the required form, the invention being particularly applicable to the nail-making machinery described in the specification of an invention for which Letters Patent were granted to G. T. Bousfield, May 15, 1855, No. 1099, by which said machinery the heads of the nails produced are not made so large as is required. To remedy this defect according to this invention the end of the blank when in position to be headed is inclosed on all sides by a case made in parts, constituting when brought together a mould whereinto the heading punch enters and by its pressure upsets the end of the blank, spreads the metal laterally, and compels it to take the shape of the cavity of the mould. The lower section of the mould is formed by a projecting portion of the bottom die, which is connected with the movable cutter, and in place of the discharge punch in use, a top die corresponding to the finished thickness of the head of the nail is employed; this die forms the top of the case, and when the nail is finished it effects its discharge from the mould, being caused to descend by a connection with any suitable part of the mechanism, and raised by a spring.

[Printed, 8*d.* Drawing.]

A.D. 1859, November 21.—Nº 2631.

WHITTLE, William.—This invention, relating to the manufacture of nails, consists,—

1st. In making nails out of rods either round or oval in cross section, because during the rolling process such form of rod is not liable to the formation of burrs.

2nd. In so rolling sheets or flat bars of iron as to produce a longitudinal variation in the thickness at regular intervals, forming a series of inclines on the surface of the bar, so as when such rolled bars are afterwards slit into nail rods, each rod may have the form of a series of nail-blanks joined head and point together. The machine employed for slitting the rolled bars operates by means of a broad cutter slide-frame, which is moved up and down between vertical guides by an eccentric. Along the bottom edge of this sliding frame is screwed a steel cutter, which cooperates with another cutter rigidly fixed to the frame, and the rolled bar being caused to advance when the slide-frame rises, a fresh strip is cut off every time it descends. The nail rods thus cut off are annealed in a furnace previous to the cutting off and heading process. This furnace contains heating pipes wherein the rods are laid and subjected for the necessary space of time to the required degree of heat.

3rd. One of the rollers employed to roll the bars has its periphery cut in the direction of its length into a regular series of eccentric curves which, when the bar is passed between the rollers, produce regular variations in its thickness, forming at regular intervals sudden transverse ridges and intermediate inclines.

Describes a mode of rolling nail rods by means of rollers with movable flanges having their contiguous faces slightly inclining or conical.

The annealed rods after being straightened and planished are passed to the heading machine, into which they are supplied by feeding rollers; they are held by clamping dies whilst the heading die advances and moulds the head, and are cut off or divided at the successive junctions (formed by the rolling process) of the heads and points.

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1859, December 1.—Nº 2721.

TILL, Thomas.—(*Provisional protection only.*)—This is an invention of machinery for forging horse-shoe and other wrought iron nails. The machine contains four slides, each carrying a hammer die, and respectively arranged to act in slide boxes, radiating at right angles from a common centre. By means of cams and an arrangement of connecting rods and bell crank levers, simultaneous convergent and divergent action is imparted to the dies, which when brought together form a central space between them corresponding exactly to the form of a horse-nail. Into this space the rod heated to a welding heat is gradually inserted, and reduced to a point by the successive blows of the dies. After this operation the rod is removed to a cutter, that takes off the tapered end, and with it a small portion of the rod, just sufficient to form the head of the nail.

In machines for making rose-headed nails, five hammer dies are employed.

[Printed, 4*d*. No Drawings.]

A.D. 1859, December 8.—Nº 2786.

NORRIS, JOHN, junior, and TILL, THOMAS. — (*Provisional protection only.*)—This is an invention of machinery for the manufacture of horse and other wrought-iron nails. The machine comprises four hammer dies, which act alternately in pairs, converging from opposite directions towards a common centre occupied by the end of the heated metal rod of nail iron, from which the nails are formed. Each pair of hammer dies acts in slides, one pair at right angles to the other, and by means of connecting rods and levers, actuated by cranks or cams, the two hammers of each pair are caused to diverge and converge simultaneously, the two pairs thus operating alternately at the central point upon the end of the heated rod. After the shaping operation of the nail, the rod is removed to a cutter, by which the desired length is cut off, including a sufficient portion of the rod to form the head.

[Printed, 6*d*. Drawing.]

A.D. 1859, December 24.—Nº 2940.

BARLOW, HENRY BERNOULLI. — (*A communication from Joseph P. Haigh.*)—The nature of this invention consists,—

1st. Of appliances adapted to the holding head of a screw cutting machine for opening and closing the cutting dies; this is effected by a pair of catch levers, brought alternately to act on a spring catch connected to the chuck by rods having adjustable stops actuated by the to-and-fro movements of the holding head.

2nd. Relates to a chuck adapted to screw-cutting machines for holding the cutting instruments. "This chuck is made with a " ring having a portion of the inside recessed to receive the outer " ends of the cutting dies, and with a cam spring, catch lever, " cam, and locking stud, for bringing the cutting dies into and " out of action."

3rd. " Consists in making a chamber round the die box for " the cams that act on the cutting dies to travel in, also in " making the regulating stud in three parts, namely, a bolt or " pin, a cylinder, and a nut, in order to facilitate the changing " of position, and to prevent its slipping."

4th. The " arrangement of the die box, cutting dies, cap and " ring, also in the application of an excentric lever to the face " plate in combination with a lever, cam, locking stud, and " spring catch."

" The regulating stud is set so as to allow the cutting dies to " cut the desired depth of thread; the lever is then drawn forward until the catch grasps the regulating stud; the bolt or " article to be screwed is then placed in the chuck, and when the " desired depth of screw is cut, the spring catch is pressed back " against the lever until it comes in contact with the excentric " lever. This movement of the catch and lever will move the " ring with cams which will release the cutting dies from the " work."

[Printed, 10*d*. Drawings.]

A.D. 1859, December 28.—N° 2962. (* *) .

ROSTAING, Charles Sylvester.—" Improvements in com" bining and mixing gutta percha with mineral and vegetable " substances capable of altering its quality in such a manner as " to produce hard, resistent, unalterable, and imputrescible com" pounds diversely colored." These compounds are applicable, amongst other purposes, to making screws to replace wooden screws.

The colours used in this invention are obtained by baking in a muffle or crucible a suitable metallic oxide mixed with water or a mineral acid. The baked oxide after cooling is reduced to impalpable powder and then dried and sieved.

The preparation of the various compositions is divided "into " eight different operations," as follows:—

1st. The partial purification of the gutta percha by boiling it in soft water, flatting it, and again boiling it "in a decoction of " 'radix saponaria alba' or soap wort."

2nd. The complete purification of the gutta percha by boiling it in a causic lye and flatting it.

3rd. The preparation of "artificial silicate of zinc."

4th. The preparation of "silicate of alumina and of zinc."

5th. The preparation of talc "rose colored by oxyde of cobalt."

6th. The preparation of a combination of zinc blende "with " kaolin or with felspar."

7th. The preparation of a combination "of tannin, gutta " percha, chloroform, benzoin, balsam of tolu, or essential oil."

8th. The preparation of a combination of gutta percha with catechu, to which camphine or benzin may be added.

The drawings show a machine for mixing the above-mentioned compositions, consisting of a vessel heated by a steam jacket and having suitable rollers and scrapers.

[Printed, 1*s*. 4*d*. Drawings.]

1860.

A.D. 1860, January 10.—N° 66.

HENRY, William Arthur.—(*Provisional protection only.*)— This invention relates to machinery or apparatus adapted for the manufacture of "screws of all kinds, and consists in the employ- " ment of a toothed rack working in suitable guides in the base " plate of a poppet head; this rack has a reciprocating motion " imparted to it by means of a connecting rod worked by an ad- " justable crank pin in a slotted disc, which is carried on the end " of a shaft in a separate poppet head. The reciprocating rack " gears into a spur pinion carried on a short intermediate spindle, " which spindle also carries a spur wheel gearing into a pinion or " series of teeth formed on another spindle above, and which " works in the bearings of the first-mentioned poppet head. It " will thus be obvious that on imparting a continuous rotary " motion to the spindle which carries the slotted disc, a recipro-

" cating motion will be imparted to the rack, which motion may " be increased or diminished in extent by suitably adjusting the " stud pin in the slotted disc further from or nearer to the centre. " The reciprocating motion of the rack imparts a circular motion " to the toothed gearing herein-before referred to, such circular " motion being reversed at each single stroke of the rack; con- " sequently the main spindle in the first mentioned poppet head " will make a certain number of revolutions in one direction, and " then an equal number of turns in the reverse direction, the " number of revolutions being regulated by the throw of the " crank pin. As applied to the manufacture of screws, a suitable " gripping apparatus is fitted on to the end of this spindle for " holding the lengths of material to be made into screws. When " tapered screws are to be made, the dies are not tapered, and are " made to open or expand and close again as the screw enters and " recedes, by a self-acting arrangement consisting of suitable " connecting links actuated by a counterweight."

[Printed, 4*d*. No Drawings.]

A.D. 1860, January 12.—N° 90.

TWENTYMAN, ALFRED CHARLES.—(*A communication from James H. Shweet.*)—This invention relates to machinery for making spikes, bolts, rivets, screw-blanks, and similar articles. The machine as described and illustrated is adapted to the making of that kind of railway spikes which is known as the American spike. It consists of " a combination of grooved rollers, gripping " tools, and dies. The rods of metal of the required guage or " thickness are fed in a heated state between a pair of grooved " rolls formed by fixing chill cast-iron rings upon smooth rolls. " These rolls are also furnished with cutting and pointing tools, " so that as the rod is fed between them it is cut into the requisite " lengths, each length being at the same time pointed, if a point " be desired. The blank for the spike or other article, if required " to be headed, is then taken from the rolls by the nippers and " clutched in a gripe, by which it is held whilst being operated " upon by the heading tool; it then drops from the machine " finished."

" In adapting the machine to the manufacture of other forms " of spike, or of any of the other articles named in the title, it " would be necessary simply to change the section of the rolls,

" the shape of the pointing tool, or to dispense with this tool " altogether, to alter the faces of the gripping dies and anvil dies, " and of the heading tool, if a heading tool be used, with other " minor details involving no essential departure from the principle " of the machine as illustrated."

The heading bar and other parts of the machine are adjustable to make various sized articles, and a relief spring apparatus is applied to prevent straining or concussion in case of accident arising from an accumulation of blanks or extraneous metal choking the machine.

[Printed, 3*s*. Drawings.]

A.D. 1860, January 18.—N° 134. (* *)

SCHUBERTH, JOHANN.—(*Provisional protection only.*)—" Im- " provements in nails and similar articles, and in preparing " materials for the production thereof, and of buttons and " various other articles to which the same may be applicable." The invention consists in manufacturing the heads of nails, buttons, &c. " of porcelain or other clay or earth, or of cement, or " of wood chips or shavings, or wood waste." The porcelain (and like substance) " is pressed, turned, beaten, or brought into " the required shape, dried, glazed, and fired." A recess is left for the reception of a shank or pin, " which is affixed therein by " soldering, rivetting, pressure, or cementing." There are two formulæ given for a cement; the one contains " plaster of Paris, " lime water, white of egg, or glair, and pure oil;" the other consists of " unslacked lime, white of egg, glair, or albumen, and " slacked lime or glue, which can be liquefied by pure oil, pre- " ferring to take two parts unslacked lime to one part of glair " and one part slacked lime." The heads may be " colored or " marbled by painting or by combining coloring matter with the " material while in a plastic or pasty state or otherwise." Heads are produced from wood refuse " by pressure in moulds, the " shank or pin being forced in or otherwise connected." To obtain " considerable whiteness " and " excessive hardness " for the porcelain and earthen heads the patentee employs " for the " burning operation a peculiar fire flame or medium, consisting of " the gas evolved from beech wood, combustion being assisted by " free draughts of cold air."

[Printed, 4*d*. No Drawings.]

A.D. 1860, January 25.—Nº 187. (* *)

RAMSPACHER, Théodore, and SCHMIDT, Christophe Frédéric.—"Preparing wire gauze to render it applicable to "various purposes." The meshes of the gauze are filled with either gummy or metallic substances, or partly with the one and partly with the other; the gauze is afterwards covered with leather or other suitable fabric. The filling with metal is accomplished either by immersing in molten metal or by the galvanic battery; the gummy substances are applied hot or in a state of solution. For straps, either ordinary wire gauze is used, or metallic gauze without weft, or metallic gauze the meshes of which are in part filled with metallic substances, or metallic gauze with its weft made of a vegetable or animal substance; the weft should be separated, and the warp threads or wires close together. For girths "on each side several threads are passed into the same "tooth of the comb, and by this means we obtain a kind of "selvage, which gives great strength to the strap." This new material may be employed for manufacturing washers.

[Printed, 4*d*. No Drawings.]

A.D. 1860, January 25.—Nº 190.

GRICE, Frederic Groom.—This invention, relating to machinery adapted for making nuts for screws, is in part supplementary to prior letters patent granted to this inventor and bearing date April 2nd, 1856, Nº 790, which comprises a method of so compressing bar iron by dies in an ordinary press, as to give it the form of a series of hexagonal nuts joined side by side together. The mode adopted for preparing the bars according to the present invention, consists in the use of dies which close simultaneously upon the opposite edges of the heated bar, producing hexangular or other indentations corresponding to the required shape of the nut at the same time that the face of the bar is pressed upon by a series of punches, which are furnished with short central projecting tapering pins, that form the central holes by forcing the heated metal to spread laterally and caused it to fill the remote corners of the dies, the bar being turned during the operation in order that both sides may be subjected to the pressure of the punches. In some cases flat punches in the die box are employed to form the central hole, and the nuts are made singly and cut off in the machine in which the bars are shaped and perforated, the cutting off being effected by the edges of the dies.

[Printed, 8*d*. Drawing.]

A.D. 1860, January 25.—N° 195.

LAMAR, Jean Pierre.—(*A communication from Charles Jarrin.*)—This invention relates to the manufacture of screws, adapted for fixing soles and heels on boots and shoes, leather for sadlery and upholstery, canvas for tents, metal plates for ships, and other purposes; these screws may be made of metal, and also of hardened india-rubber or gutta percha, and other suitable substance.

The apparatus adapted for forming the screws, is fitted to slide vertically in an upright frame, the operating downward movement being effected by means of a foot treadle, and the return upward motion by a counterbalance weight. The wire is coiled on a reel mounted at the top of the apparatus, and passes off downwards into a hollow spindle, which towards the lower end is screw-threaded, and is caused to revolve by bevil tooth wheels. The extreme lower end of the spindle is furnished with a pair of threading dies, which screw the wire as it comes down, and after sufficient length of screw has passed into the boot sole, the screw is cut off by nippers, and the adjustable last which carries the boot or shoes, is shifted to a fresh position to receive the next screw.

Some of the screws employed àre capable of adjustment, and may as they wear by means of a screwdriver, be made to project more or less from the sole, the upper part of the screw, which is cross nicked, passing completely through to the inside of the boot or shoe, where the screwdriver is to be applied.

[Printed, 8*d*. Drawing.]

A.D. 1860, February 8.—N° 343.

NEWTON, William Edward.—(*A communication from George Willard Reed Bayley.*)—This invention relating to railways, refers to the rails, rail supports, fastenings, and nut fastenings of the rail bolts employed in the construction of the permanent way, it consists—

1st. Of a reversible rail the transverse section of which has the form of a **Z**, being a double headed and flat footed rail com-

bined—

2nd. "Supporting, bracing and giving an artificial bearing to " railway rails, particular the Z-rail at the intermediate cross ties " between the joints, or if necessary at the joints themselves, so as " to obtain at such points on the cross ties any desired width of " rail base without adding to the weight of the rail, and without " using bolts to effect this object. For this purpose are used " either wrought or cast-iron brace pieces, which are confined in " place upon the cross ties and against the outside of the rails by " one or more hold down spikes, having a peculiar rounded head, " which are driven either through the base of the brace-bearing " piece or through a notch punched through the thin edge of the " base."

3rd. Securing the joints of railway rails by means of brackets and fishing bars, which at the same time are fixed firmly to the cross ties or sleepers, the brackets and fishing bar extending across the rail joints, being clamped to the rail and the sleeper by a wedge bolt, key, and gib-shaped pieces, and fastened down by a spike driven through a hole in the base of the bracket into the sleeper, the head of the spike serving the two-fold purpose of holding down and retaining the key wedge in place.

4th. Locking the nuts of the screw bolts employed in jointing railway rails, by means of wedges or keys, or nut guards, which when the nuts are tightened up, are driven between the undermost side of the nut and the top surface of the foot of the bracket.

5th. Railway spikes formed with angle heads, and a lip under the back of the head for admitting beneath it a crow bar, for the purpose when required, of drawing the spike. The heads of these spikes project in front, and they not only hold down the rail and bracket, but they also abut against the nut guards, and so keep them in their places.

[Printed, 2*s*. Drawings.]

A.D. 1860, March 14.—N° 683.

NEWTON, ALFRED VINCENT.—(*A communication from John Waldron Hoard and Thomas A. Searle.*)—This invention relates to apparatus adapted for feeding, prepared metal strips or narrow nail plates to nail cutting machines. The prepared narrow plates are piled in a narrow box, which has a thin slotted opening along the bottom part of one side. Through this opening the lowermost plates in succession are pushed out sideways by two pins attached to a swinging frame, and according to the working speed of the machine, they are caused to follow each other into a trough, and thence by gravitation, the whole apparatus being placed incliningly, they side into a tube or barrel, to the mouth of which a pair of feeding rollers is applied, in a manner to adapt themselves to feed plates of different size or thickness. This tube is drawn back and caused to rotate on its axis half a revolution after every cut, so as to present to the cutters of the machine alternately the opposite edge of the nail plate, wherefrom by turns the points and heads of the nails are formed. The successive movements of the feed rollers are produced by means of pawls and ratchet wheels in combination with the longitudinal action of the barrel, the form of the interior of which towards the feeding rollers inclines to a narrow slot.

[Printed, 8*d*. Drawing.]

A.D. 1860, March 26.—N° 783.

JOHNSON, John Henry. — (*A communication from Jean Baptiste Vin.*)—This invention relates to a rolling machine, designed for shaping and manufacturing metals into a variety of articles, including amongst other things the making of large nails.

The machine, which is capable of the adjustment and modifications necessary to produce a variety of articles for divers purposes, is described with reference to its adaptation to the making of shovels, trowels, spatulas, etc.

" In making a shovel by this system of rolls, a piece of sheet " metal is first taken to a pair of cylindrical rolls, where it is " lengthened and widened so as to form a rectangle. One side " is now channelled so as to form the socket of the shovel by " submitting it to the successive action of a set of graduated rolls " having a flattened portion on their peripheries. From these " last-mentioned rolls the metal is taken to a pair of eccentric " rolls, so shaped as to curve or bend the metal, which is then " passed between the jaws of a pair of shears, and to complete " the socket it is passed through a pair of grooved rolls in conjunction with a fixed conical mandril; the eccentric rotation of " these rolls double up the sides of and complete the rounded " socket. The plate is then presented edgewise and passed " between two deep and narrow grooves which impart the proper " obliquity to the sides. The metal is next subjected to another

" pair of rolls, which are so formed as to flatten it and also to
" form the sides."

"In the manufacture of trowels it is proposed to use rolls fitted
" with moveable rings, and provided with a matrix; by the addi-
" tion or diminution of the rings, and by adjusting the distance
" between the rolls, the sizes of the trowels may be varied."

[Printed, 8*d*. Drawing.]

A.D. 1860, March 29.—N° 811.

NORRIS, John, junior, and TILL, Thomas.—(*Provisional protection only.*)—This invention relates to machinery for the manufacture of horse-shoe and other wrought-iron nails.

Reference is made to Letters Patent bearing date May 15, 1855, No. 1099, which were granted to G. T. Bousfield for nail-making machinery, the object of the present invention being the production of horse-nails with larger and more solid heads than the said previous machinery accomplished, by reason of the lateral expansion of the metal when pressed between two dies. To this end, according to the present invention, a bottom or gripping die is used of increased width, its face and the operating faces of the other dies, assimilating to the exact shape required for the head, which is formed by the dies in conjunction with a top shear and a forcing slide, acted upon by a heading punch. In place of a single, a compound link furnished with screw adjustment is employed in the improved machine, and a spring to prevent concussion or back-lash is attached to a lever which works the forcing slide.

For making other wrought-iron nails, the faces of the dies, the slide, and the heading punch, must be appropriately modified.

[Printed, 8*d*. Drawings.]

A.D. 1860, April 5.—N° 869.

FULLER, John Hobson, and DAVIDSON, William.—This invention relates to cutting screw threads on, and for transversely dividing, pipes and round metal. The apparatus employed is similar to a pair of hand stocks, with one threading die for the purpose of screwing pipes, or a cutter when pipes are to be divided. The pipe or bar which is passed through the stocks in the usual way, is supported at three points relatively triangular, two being fixed surfaces that resist the pressure of the third, which constitutes the threading die. The pipe is to be securely held in a vice, and the apparatus is worked round by hand in the ordinary manner; the die being fitted to slide in a recess is advanced by a circular nut, which takes into a screw thread cut on the stock handle. For the purpose of dividing pipes or round bars, the cutter is fitted to slide in a groove in the opposite handle, and is advanced by a circular nut in the same manner as the die.

[Printed, 6*d*. Drawing.]

A.D. 1860, April 14.—N° 939.

JONES, Abraham.—This is an invention of mechanical apparatus adapted for making rivets, screw blanks, and such like articles, by means of an intermittently revolving horizontal disc or die holder, carrying a circumposed series of dies, which severally in rotation come round and by turns rest directly beneath in a position to correspond with a vertical acting heading tool or punch. This tool is carried by an adjustable slide, and at the proper intervals corresponding with the intermittent movements of the disc, is caused by means of a cam on the main shaft to descend, and act direct upon the pieces of metal, which are cut by the action of the machine from the bar, and fed by the attendant into the dies, as they in rotation come round to the feeding point. The revolving die holder is actuated by a star and retention motion, the cutters are angular and work horizontally, cork is used as a yielding cushion for the cam shaft couplings to resist the upward pressure, and the couplings are supported by adjustable cotters. The finished rivets and articles are by turns forced out of the dies by a rod, and when articles requiring polygonal heads are in process, the heading punch is made to enter the dies, and the edges of the latter are bevelled.

[Printed, 1*s*. Drawings.]

A.D. 1860, April 16.—N° 947.

BROUGH, Robert, and COX, Richard.—(*Provisional protection only.*)—This invention of mechanism for manufacturing spikes, nails, pins, rivets and other articles, consists in rolling, forging, pressing, and drawing metal rods, bars, and pieces, by means of four rollers so geared together, that they all revolve simultaneously at a uniform speed. These rollers operate in pairs upon the heated bar or rod, which passes through an orifice formed by the mutual approach or contiguity of their peripheries, their axes being on the same plane. The peripheries of one pair called the "forming rolls" are indented and eccentrically curved at corresponding segmental distances, so that the passage through which the bar or rod passes between as the rollers revolve, enlarges and contracts, and by this means the bar is made at regular intervals to vary in thickness, and in conformity with the shape of the rollers to take the form of a series of spikes, nails, or other articles, the peripheries of the other rollers being in some cases plain, and working in close contact with the forming rolls, one on each side, or all the rollers may have shaped peripheries, and be suitably recessed to form heads projecting on all sides of the articles produced.

[Printed, 4*d*. No Drawings.]

A.D. 1860, May 3.—N° 1110.

DIXON, Adam.—(*Provisional protection only.*)—This invention, relating to the construction of stocks and dies, consists of:

1st. "The method of making the bodies of the dies, whether
" stationary or moveable, used in screw stocks for cutting screws
" of a circular or cylindrical form, and boring out the recesses in
" the stocks into which the dies fit so as to correspond, by which
" means greater economy is effected in their manufacture by an
" important saving in the workmanship."

2nd. "Imparting to the moveable die or dies a repelling or
" drawing-back action by means of the same mechanism, which
" gives a propelling or forward motion simply reversed in its
" action. In the case of screw stocks having only one moveable
" die, this propelling and repelling motion is thus arranged; to
" the body of the stocks a screwed nut is held stationary, so far
" as any advancing or receding motion is concerned, but allowed
" to revolve freely; this nut fits on to a screw, either solid with
" the moveable die itself or separate and connected to the back of
" said die. In the case of screw stocks having two or more move-
" able dies, and thus requiring a simultaneous action for each
" die, this propelling and repelling action may be thus arranged;
" on one of the handles of the screw stocks, and close to the
" body of the stocks, revolves a small toothed wheel gearing into
" two others, one on each side. The side wheels also forming
" nuts and working the dies by a screw to each die, similar to
" that already described, or this action may be modified when

" fixed clear of the handles of the stocks by using only two " instead of three toothed wheels; the two wheels gearing into " each other and actuating the dies by right and left hand screws. " These improvements may be used either in conjunction with " each other or separately."

[Printed 4*d*. No Drawings.]

A.D. 1860, June 6.—N° 1390.

JEWSBURY, JOSEPH.—This invention relates to self-acting apparatus, adapted to lathes employed in pointing, turning, and worming wood screws, and to the revolving tables of nicking machines, which instead of being placed horizontally or upright, are inclined to an intermediate angle, in which position the blanks are more easily fed from the slotted rail.

With regard to lathes, the self-acting holders and feeders of a series of pointing, turning, and screwing lathes, are actuated by means of a series of cams, situated on one shaft or axis, which receives motion by means of gearing or otherwise from one of the lathe heads, and is disposed midway between two parallel rows of lathes, the cams acting upon levers which feed and support the screw blanks whilst operated upon by the tools in the lathe head. The claws or holding tools may be circular or angular, having radial notches with sharp edges formed in a countersink at one end, whereby during the pointing process the head of the blank is held.

[Printed, 10*d*. Drawings.]

A.D. 1860, June 20.—N° 1495.

HART, HENRY.—(*Provisional protection only.*)—This invention of machinery for cutting and shaping metals and substances, " relates to a peculiar combination of apparatus or mechanism " for cutting and shaping metal and other substances, and " consists of a compound machine fitted with all the requisites " for turning in wood or metal, screw cutting, shaping and planing, " cutting the teeth of wheels, slotting, boring, drilling, and key-" way cutting, either horizontally or vertically. This compound " machine consists of a slotted bed plate supported on suitable " standards and provided on its front edge with a compound " *slide rest* working along a dove-tailed guide formed on the

" edge of the bed plate. This slide rest is capable of being
" removed from its sliding bracket, and fitted on to any other
" part of the bed plate, and may be made self-acting or not as
" required. The opposite edge of the bed plate is also formed
" with a projecting dovetailed guide, which carries a drilling,
" slotting, or planing table capable of being adjusted horizontally
" and vertically to any desired position, by means of suitable
" adjusting and traversing screws. This table is also provided
" with a circular table or plate rotating horizontally and formed
" with slots for the facility of securing articles thereon. The
" surface of the bed plate carries the ordinary headstocks of a
" turning lathe, and also carries a drilling machine, a slotting
" machine, and a planing or shaping machine, any one of which
" may be removed and fitted on to the end of the bed plate if
" requisite, suitable bolt holes being formed in each end of the
" bed plate for that purpose. The whole may be driven by a
" treaddle or by power, according to the size of the machine."

[Printed, *4d*. No Drawings.]

A.D. 1860, July 3.—N° 1604.

LANE, Joseph.—(*Provisional protection only.*)—The object of this invention, which relates to screw cutting lathes, is the application of an indicating apparatus to such lathes, for the purpose of signalling the exact time when the nut of the saddle is to be geared with the screw, thereby to avoid inaccuracy and the damage of the screw in process of being cut. "For this
" purpose I place a cam on the lathe mandril and another on the
" loading screw, each of which take effect every revolution,
" the one on the tail end of a lever, carrying a bell, the other on
" the tail of a hammer, both being brought back to position by
" suitable springs. If, for instance, we suppose the loading
" screw to have four threads to the inch, while the screw to be
" cut is required to have seven threads to the inch, although each
" of the cams act on their respective levers at each revolution, the
" two only act in conjunction at every seventh revolution of the
" mandril; when so acting in conjunction the hammer strikes
" the bell, and indicates the precise movement to gear the nut
" of the saddle with the screw. If nineteen threads to the inch
" are to be cut, the requisite changes are made in the wheels; to
" do so, the cams now only act in conjunction once for every

" nineteen revolutions of the mandril. Instead of an audible " signal, the apparatus may be arranged to produce a visible " signal, but I prefer the audible one described."

[Printed, 4*d*. No Drawings.]

A.D. 1860, July 18.—N° 1745.

STEVENS, CHARLES.—(*A communication from J. B. Derenne.*) —This invention, relating to "a machine for screw-cutting bolts " and turrels or rings," is composed of the following pieces and thus described.

"An adjusting screw; a cross bar, serving as nut screw to the " adjusting screw; a cross bar with rings at the ends serving to " raise a roller supported on bearings; a motive roller which " communicates movement to the first-mentioned roller, & to a " third one by means of gearing pieces. The three rollers all " turn in the same way, the bolts &c. to be screw-cut entering at " an opening between them. The first-mentioned roller is moveable, and thus permits of the diameter being varied. The " mode of fixing the apparatus may be varied without in the " least changing the working of the machine. The arrangement " of the worm or thread on the rollers, is made according to the " worm which it is desired to give to the piece intended to be " screw-cut. The three rollers are screw-cut at their extremities, " & the part screw-cut is a steel rundle, which is renewed as may " be required."

[Printed, 4*d*. No Drawings.]

A.D. 1860, September 8.—N° 2175.

HORTON, ENOCH.—This invention, relating to the manufacture of bolts, nuts, and screws, consists;

1st. Of apparatus for turning the heads of bolts and screws, comprising a headstock with back gearing and a hollow revolving mandril, which has also longitudinal liberty to slide. The bolt or screw to be operated upon is inserted and held in the end of the mandril, or in a chuck carried thereby and suitably formed to receive the bolt or article and carry it round. Six cutters, three on each side, are disposed in suitable positions for acting upon the bolt head. One cutter turns the top of the head and another the underside, the remaining four cutters being adjusted to turn the edge. These cutters are regulated by levers operated by a cam, the mandril being caused to advance at a speed regulated in accordance with the working speed of the cutters, and when finished the bolt is pushed out of the chuck by a rod which passes through the hollow mandril.

2nd. In the apparatus used for pointing bolts and screws two cutters are employed. This apparatus is also similar to a lathe headstock with a sliding mandril, which carries the bolt by the head in a suitable chuck. The point of the bolt projecting from the chuck is by means of a lever brought into contact with the cutters, which are shaped to the required angle, and disposed so as to act simultaneously at opposite sides of the point.

[Printed, 8*d*. Drawings.]

A.D. 1860, September 14.—N° 2227.

TILL, Thomas.—(*Provisional protection only.*)—This invention of machinery for making wrought-iron nails is more particularly adapted to the manufacture of horse-shoe nails. The machine comprises two top and two side hammers, which by means of cams and springs act upon two heated rods introduced by the hand of the operator into the machine, through grips sliding in grooved beds. After the two side hammers have operated upon a portion of the extreme ends of the rods supported against a central anvil die, the latter is withdrawn, and the top hammers come into operation upon the partially formed nails, which are then supported by a bottom anvil die. When in turn the top hammers have operated upon the end portions of the rods, two cutters advancing are struck by a projection on the end of each top hammer, and by them the two nails are thus severed from the rods. The hammers, forced back by cams, are actuated by the reaction of springs; an adjustable gauge at the back of each cutter determines the length of the nails, and their shape is produced by the forms of the dies on the anvil and hammer faces.

[Printed, 8*d*. Drawings.]

A.D. 1860, September 20.—N° 2290.

LAURENT, Victor Hippolyte.—The object of this invention is an improved machine "for forging nails, screws, bolts, rivets, "and railway spikes," the machine acting by a succession of operations, viz., forging the stem or shank; feeding the machine; heading and cutting off; stamping the head, and driving the nail out of the heading stamp, the several stages of the process being carefully described and illustrated.

The red hot iron is introduced progressively by a lever between four forging hammers, severally carrying specially formed forging dies. These hammers are respectively placed at right angles and operate alternately in pairs, the hammers of each pair striking simultaneously on opposite sides of the nail shank. The forging operation by the hammers commences at the extreme end of the rod, and the pressure or energy of the hammers respectively diminishes gradually whilst the shank of the nail, from the point to beneath the head, is being shaped, so as to give it the usual tapering form. The same feeding apparatus then introduces the forged shank into a stamping die, and a cutter takes it off the rod; the feeding lever than moves away, and a stamping punch, coming forward from an opposite direction, forms the head. The finished nail is then forced out of the stamping die either by a blow or by pincers. Horse nails require additional sharpening at the points after they leave the machine, for which purpose a suitable apparatus is described.

[Printed, 5*s*. 4*d*. Drawings.]

A.D. 1860, October 9.—N° 2444.

SNELL, WILLIAM.—(*A communication from Amos Whittemore.*)—This invention relates to machinery for making horse-shoe nails. The machine contains two hammers carried by a sliding frame, and having alternate action, one acting upon and the other at the side of a vibrating anvil which carries the dies; these dies are respectively grooved and fashioned, one to form the body of the nail and the other the head, as the hammers in rapid succession fall upon the heated metal rod, the end of which after the head and shank are formed, is drawn out or beaten to a point as the anvil is forced back by a cam. When this part of the operation is completed, the anvil is relieved and drawn back by a spring. and the nail is cut off to the required length by shears, which are brought forward by a cam, and afterwards fall back into position in readiness for the next operation.

A furnace for heating four rods alternately may be placed contiguous to the machine, or it may be placed in such a position, that one rod gradually drawn through will in the heated state feed the machine at the required speed.

[Printed, 10*d*. Drawings.]

A.D. 1860, October 12.—Nº 2485.

NEWTON, William Edward.—(*A communication from Jean Felix Bapterosses.*)—(*Provisional protection only.*)—This invention, relating to the manufacture of furniture nails, tacks, and fastenings provided with metalic pins or pointed shanks, is an application to such purposes of a prior invention, relating to the use of "ceramic and other substances" in the manufacture of buttons, for which letters patent, dated January 31, 1857, No. 291, were granted to this inventor, who according to his present invention employs similar substances and compositions for forming the heads of nails.

"The heads, ornamented or otherwise, are arranged in a frame, " the openings or holes in the under side of the heads to receive " the pins or points being uppermost. In each of these holes a " small lump of solder is placed, and the frame is submitted to " such a temperature as will be sufficient to melt the solder. " The pins or points are arranged in another frame in such a " manner as to coincide with the holes in the heads, and they are " inserted in their proper places by turning over the pin frame on " the other, and pressing the butt ends of the pins into the soft " solder. It will be understood that this method of securing " metallic pins or points in ceramic substances and other hard " matters, such as mother-of-pearl or hard compositions is applicable to the manufacture of a variety of articles besides those " above mentioned."

[Printed, 4*d*. No Drawings.]

A.D. 1860, October 17.—Nº 2536.

EADES, William, and WORSTENHOLM, George.—This invention, relating to stocks and dies for threading metal screws " consists in placing the adjustable dies into the stock in a radial " direction, and fitting on the shoulder of the handle next to the " moveable dies a sliding collar flanged at the outer ends for " receiving set screws, which screws abut against the outer end " of the moveable dies, and through this slide and shoulder of " the stock a wedge is fitted with an adjusting screw, by the " turning of which in the direction required the collar will be " advanced or freed back, so as to press in or free the dies. The " effect of this arrangement is of importance, as the set screws

" first referred to defines the depth of the thread and size of " screw intended to be cut, and in no instance can this be varied, " unless by altering the position of the set screws, so that we " ensure great accuracy, which is highly essential when a number " of bolts or such like articles require to be screwed of the same " size, as the last will be found to be of the exact size and depth " of thread as the first, both fitting the same nut when in use, " but when the dies requires shifting for cutting larger or smaller " screws, the re-adjustment is first effected by the side screws " applied to the flanges of the collar before referred to, but the " distance between the flanges and the shoulders of the stock at " all times define the range of the collar and the depth of the " thread, the collar being gradually advanced towards the dies by " the screw wedge before named. And this same result may also " be obtained by screwing the handle at that part in contact " with the stock nearest the moveable dies, and pressing forward " the sliding collar by means of a suitable nut."

[Printed, 10*d*. Drawing.]

A.D. 1860, November 3.—N° 2695.

WEBB, Samuel, TIMMINS, Thomas, and BROUGH, Robert.—(*Provisional protection only*.)—This invention, relating to the manufacture of nails, spikes, and staples, by a rolling process, consists,—

1st. Of a machine which mounts a pair of narrow rollers that mutually act upon the heated nail rod in the manner of revolving dies, their peripheries being so grooved and indented, that as they work together, a series of cavaties in the shape of nails is formed between them, which impress the nail rod and impart to it the appearance of a string of nails, its lateral expansion being regulated by movable rings or flanges. This machine is adapted to the making of clasp-headed nails and spikes.

2nd. Relates to a modification which as a lateral support to the nail rod during the process of rolling substitutes for the movable rings or flanges endless chains made of flat links or plates jointed together. This machine is capable of making rose-headed nails, the sides of the heads being formed by indentations made in the edges of the links of the chain. In both machines the rollers and rings or chains are caused to revolve at a uniform speed and made correctly to co-operate by means of suitable gearing.

Staple rods are pointed by a similar rolling machine, and bent into form by suitable dies as they pass from between the rollers.

[Printed, 4*d*. No Drawings.]

A.D. 1860, November 17.—Nº 2828.

RADCLIFFE, Jacob Henry.—(*Provisional protection only.*)—This invention relates to lubricating apparatus adapted for supplying oil or other similar lubricant to taps and screw cutting dies whilst operating, and to other purposes. It "consists of a " tubular air chamber affixed to a hole about three-sixteenths of " an inch from the centre of a screw cap which is screwed into " the oil vessel receiving air from the outside, and delivering it " about three-sixteenths of an inch from the centre, near to the " screw cap, and opposite the receiving hole inside the vessel. " To effect this a tube is affixed, bent in the form of a fork, " one leg being a quarter of an inch longer than the other, and " screwed to the hole in the screw cap, so that it can be removed, " cleaned, or replaced by another when out of order, or to produce the same effect there is affixed a small tube to the hole " which is covered by another tube with a crease and small " aperture opening inside the vessel near the screw cap and opposite to the air receiving hole. This is covered by another tube, " one end of which is closed and made to slide on the last tube, " so that the air will be delivered at the top inside the vessel, " this case being moveable, so that the air chamber or pipes may " be cleaned when required or out of order. There is also affixed " a draw pipe to the centre of the screw cap for conveying the " oil from the said vessel when the oil is required to flow at " intervals, as in the process of manufacturing bolts; the bottle " or vessel is inverted and placed over the dies of the screwing " machine, and the draw pipe affixed to the die jar, so that the " oil will flow when required upon the bolt as the dies are " brought together, the draw pipe being moved to the hole in " the centre of the screw cap at the same time. The vessel containing the oil being placed in an inverted position in a bracket " and resting upon a wire spring, there is a lever or hammer " which, being worked by means of a wheel and friction pulley " attached to the shaft or machine to which the vessel and " apparatus is fixed, falls upon the vessel, and by the blow from " the said hammer or lever causes it to vibrate and to discharge " the oil directly upon the place requiring it."

[Printed, 4*d*. No Drawings.]

A.D. 1860, November 21.—N° 2851. (* *)

DEARDEN, HENRY.—(*Provisional protection only.*)—"Improvements in machinery or apparatus for punching washers for "giving the necessary drag of friction to the spindles and "bobbins of spinning machinery and similar purposes, and also "in the method of using or working the said washers."

"This invention consists of improved machinery or apparatus "for measuring and punching the holes of washer cloths and "strips of metal for forming a compound washer which slides "on the bobbin frame. The strips of cloth or metal are passed "through guides capable of being adjusted to any required width, "then passed under a punch and between two rollers. On the "shaft of the bottom roller there is a lifting tappet, the lifts of "which are in proportion to the circumference of the roller and "the distance required between each hole of the washer cloth or "metal. The punch after being raised by the tappet is pressed "by a spring with the force required to punch the holes, which "holes are round, oblong, or other desired shape." The inventor states that in order to slide the washer from time to time, so as to place it in a fresh position, "and thereby economise the material," he employs a washer with oblong holes, and places it upon a metal plate or slide having holes of a similar shape, "so that by means "of a rack or other contrivance the plate and washer cloth for "the entire length of spindles can be shifted as required."

[Printed, 4*d*. No Drawings.]

A.D. 1860, November 23.—N° 2867.

DERING, GEORGE EDWARD.—This invention, relating to the construction of, and to the appliances employed in jointing or connecting the parts comprising the permanent way of railways, consists, amongst other things, of a system of uniting the ends of the rails which abut together to form the continuous line, by means of a spring "clip" made out of tempered steel or wrought iron plate. This clip embraces the contiguous ends of both rails, passing underneath and fitting round their lower edges and clasping their two opposite sides, the edges of the clip abutting against the underside of the top surface of the rails.

"Keys, wedges, trenails, or spikes, ... are formed "hollow or slotted or split, in any of the forms in which such "hollow or slotted or split iron fastenings have been heretofore "made; or of any other suitable forms; and they are tempered

" if made of steel, or if of wrought iron they are case or surface " hardened for the purpose of rendering them elastic, in order " that they may possess a sufficient tendency to return to their " original form after they have been bent or compressed out of " such original form."

"As a preventive against rust I recommend that the clips and " other fastenings, more particularly the hollow keys and trenails, " be immersed in heated gas tar, or other suitable matter; which " is best done before they cool, after the tempering or case or " surface hardening has been offected."

[Printed, 1s. 4d. Drawings.]

A.D. 1860, December 1.—N° 2950.

TIZARD, William Littell.—The object of this invention is to prevent the unscrewing of nuts or bolts after they have finally been tightened or screwed up. It is more particularly applicable to bolts employed to secure the joints of railway rails and in similar cases where the bolts are subject to constant shocks and concussion, consequent on the passing of trains or otherwise. The means employed to effect the desired result consist of a washer, which is placed beneath the nut or the head of the bolt. This washer has an extension at one side or part of its periphery, which when the nut or bolt is finally adjusted is turned up against one side of the nut or head, or the extension of the washer may be slit to form a tongue or tongues, one of which may be bent up in the same manner. Another plan consists in turning up the edge of the projecting part of the washer, so as to form a way in which to drive a key between the turned up part and one side of the nut or bolt head.

[Printed, 6d. Drawing.]

A.D. 1860, December 26.—N° 3163.

DESBOROUGH, Spendlove, and MIDDLETON, Samuel. This invention relates to apparatus and appliances employed in the making of boots and shoes and articles of leather and similar substances, consisting,—

1st. In apparatus for pressing, moulding, and "lasting," the " uppers" or upper leathers of boots and shoes, so that they are contracted at the edge, and by the apparatus lapped over the sole of the last, preparatory to the application of the leather sole.

2nd. In the employment of horn, hoof, bone, vulcanite, and similar substances as suitable for manufacturing therefrom pegs for uniting the soles to the upper leathers of boots and shoes, surfaces of leather, and similar materials, such pegs being variously formed and jagged or slotted as described in the specification of two former patents granted to the above S. Middleton, dated respectively Feb. 25, 1858, No. 378, and August 31, 1859, No. 1983, which said former invention relates amongst other things to the making of pegs from metal wire, such pegs or some of them being jagged or slotted, and as a supplementary improvement, according to the present invention, the jagged metal pegs are twisted into a spiral form, which increases their holding power in the leather or material.

Wire staples with closed prongs are also used for the same purpose.

3rd. Relates to a mode of uniting leather substances to form tubular articles, such as scabbards, sockets, etc. by means of a flat strip of steel wire, whalebone, or similar flexible substance. The two edges of the leather or material are cut into a series of dovetailed tongues, which fit when the two edges are brought together exactly into or between each other; each tongue is perforated edgewise in a direct line, and they are held together by the wire strip which, reaching from end to end, is passed through the perforations.

[Printed, 1*s.* 2*d.* Drawings.]

1861.

A.D. 1861, January 28.—Nº 219.

DE BERGUE, CHARLES.—This invention, which relates to machinery for shaping metals, consists in "squeezing, forcing, " or pressing up metal in or against dies carried in or by a " revolving disc, cylinder, frame, or apparatus, presenting such " dies to the action of a header or counter die or tool, the pres- " sure being exerted by the header or counter die or tool, and " the metal being squeezed into shape during the travel or rota- " tion of the disc or apparatus, the motion of which is continuous " and not intermittent as in existing machines. Also in causing

" the header or counter die or tool to move or travel at the same " speed along with the dies carried by the disc or apparatus " during the time that the pressure is exerted. Also in combin- " ing with machinery constructed as above mentioned either one " or both of the following appliances, one being a safety ram or " plug, intended to crush or give way when the desired limit of " pressure is exceeded, and the other being an apparatus by " which the tools may be readily relieved from action (or practi- " cally thrown out of gear) without stopping the general action " or motion of the machinery, both of which appliances have " been exemplified, but in a different combination, in the com- " plete specification of Letters Patent for an invention of rivet- " ting machinery granted to me, bearing date 12th January 1860, " No. 82."

The machine described and illustrated is designed for making rivets, the metal rods in a heated state being cut into the required length. The revolving disc carries on its periphery a series of " eight dies fitting respectively into radial openings, the gearing " and crank action being so arranged that the header co-operates with each die in succession as the disc revolves, the finished " rivets by turns being forced out of the dies by an eccentric.

[Printed, 1*s.* 10*d.* Drawings.]

A.D. 1861, February 4.—N° 289.

ABRAHAM, JOHN.—The object of this invention, which relates to the manufacture of brass nails adapted for sheathing ships and other purposes, is to obviate the liability which such nails, made with plain or flat sides, have of breaking off under the head whilst being driven, and this is effected by fluting or longitudinally grooving the sides of the nails. The nails are cast in moulds in the ordinary manner, the pattern nails which impress the sand having the requisite grooved or fluted shape. The nails represented in the drawing have four grooved sides, which it is stated, although more or a lesser number of grooves may be used, are found sufficient for all ordinary purposes, the grooves commencing at the point, terminate near the head.

The nails so made are not only lighter and stronger, but an additional advantage is gained in the saving effected in the consumption of the metal; they require less force to drive them and it is stated they hold more tenaciously than ordinary nails.

[Printed, 6*d.* Drawing.]

A.D. 1861, February 6.—N° 305.

MARSDEN, John.—(*Provisional protection only.*)—This invention relates to mechanical apparatus adapted "for making, forg-" ing, and punching metal nuts, bolts, and spikes, or washers." It is described as follows:—" I propose to construct a cast-iron " framing firmly supported, through which passes a rotating " shaft; on this shaft is fixed a plain rim disc, the outer peri-" phery of which I face with a cog ring, having a deep flange " which is turned and secured to the back of said disc. A fric-" tion roller is placed at the back of the flange and opposite the " ram (hereafter mentioned), its object being to secure the various " parts of the apparatus from injury, and to cause the disc to " revolve without oscillation. Upon the plane of the disc are " placed two sets of inclined planes (which planes may be of any " number, but I prefer only four). On a portion of the frame I " place a cylinder in which a hollow ram works; at one end, and " each side of the ram, the die for forming the nut works. In " the hollow part of the ram I place a parallel punch; the other " end of the ram and punch is acted upon by the inclined planes " before mentioned. At the outer end of the cylinder I place a " die in two halves (of the form of the nut I intend to make); " one half of the die is fixed to the framing, the other is made " to open by a balance weight, and close by means of a cam fixed " upon the axle of the revolving wheel. At the outer end of " this die I place another die or vice, for holding the iron of " which the nut is to be formed, one half of which die or vice is " fixed to the frame; the other half is made to close by means of " a cam fixed upon the shaft, and open by means of a spring. " I also have a shaft working upon the frame, having a pinion " fixed to it, which works into the teeth on the disc before " mentioned for giving motion to the machine."

"The cams are so placed relatively to one another and the " inclined planes that four nuts can be made at one revolution of " the disc."

[Printed, 4*d*. No Drawings.]

A.D. 1861, February 18.—N° 397.

OFFORD, Robert, junior.—This invention relates to the " adaptation of india-rubber and the compounds thereof" to the manufacture of the window frames and other parts of carriages and vehicles. These frames are made in part of the hard rubber or vulcanite, and partly of soft rubber, the object being to prevent the noise and rattle of such windows when in use, the glass being fixed in by any suitable cement which will harden and keep out wet.

The same material is also employed for washers for wheels and axles of carriages, instead of leather, gutta percha, and other substances and compounds in present use, and in order that the rubber washers may possess a proper amount of elasticity, they are made to consist of two external discs of vulcanite, having between them an intermediate disc of soft rubber, the whole being vulcanized together. By this means the necessary elasticity is obtained, whilst it is stated the vulcanite is capable of bearing the friction it is subjected to, and is not effected by the unctuous matter employed to lubricate the wheels. In some cases a single disc of the vulcanite is employed.

[Printed, 8*d*. Drawing.]

A.D. 1861, February 21.—N° 426.

BLYTH, FREDERICK DELACOURT, and ADAIR, JAMES.—(*A communication from John Hood.*)—The first part of this invention, which relates to machinery adapted for forging nails and similar articles, is supplementary to letters patent, granted for an invention of a forging machine, to A. V. Newton, bearing date June 17, 1857, N° 1699, in which machine were employed two hammers, co-operating respectively with two anvil faces formed upon a rocking shaft, and brought alternately, one into a horizontal and the other into a vertical position to resist the blows respectively by turns of the two hammers, which were also worked by a rocking shaft, and the object of the present invention is to give more liberty to the hammer arms, and by the use of an elastic medium of india rubber obtain a yielding to the concussion of the blows, and thereby prevent the consequent breakage of the hammer arms, which were formerly rigidly held by set screws.

The other parts of the invention relate to feeding the metal rods to nail forging machines, by adjustable apparatus having a to-and-forth movement through the machine frame, and to the manner of severing the forged nail from the bar, which operation is performed by a cutter that obtains motion from a tappet, brought into operation when required to raise the cutter by means of a sliding piece, which is projected forward by means of a handle under the control of the workman, and subsequently returned by a spring.

[Printed, 10*d*. Drawings.]

A.D. 1861, March 5.—N° 563.

NEWTON, Alfred Vincent.—(*A communication from Benjamin A. Mason.*)—This is an invention relating to "machinery for forg- "ing horse-shoe nails, spikes, and other like articles." The machine described carries four hammer dies on a vertical plane; these dies act alternately in pairs, the dies of each pair being disposed in radial lines intersecting at right angles a common centre, the two dies of each pair striking simultaneously upon the opposite side of the nail or article in process of manufacture. The end of a metal rod, out of which the nails are formed, is gradually introduced at right angles to the plane of action of the dies at their central meeting point by a horizontally grooved feeding slide, and after each successive operation the slide is drawn back, and the nail is cut off at a regulated length by a vertical cutter The alternate convergent and divergent motion of each pair of hammer dies is imparted to them by a revolving cam, the path in which is suitably formed to cause the dies to act simultaneously on opposite sides of the nail.

Other suitable means may be employed for actuating the dies.

[Printed, 8*d*. Drawing.]

A.D. 1861, March 22.—N° 728. (* *)

SWINDELL, Charles Evers, RUSSELL, Joseph, and PRICE, Joseph.—"Improvements in the manufacture of horse "nails."

"Our invention consists in the use or application to the partial "manufacture of horse nails of a fixed hammer, commonly called "an oliver, worked by means of the foot in connection with a "suitable die or dies, by which means we are enabled to partially "form horse nails with great rapidity and uniformity of size in "the head part, leaving the body or shank of the nail to a subsequent process of finishing, hammering, or drawing out to the "length and size of nail required."

[Printed, 8*d*. Drawing.]

A.D. 1861, April 5.—Nº 839.

BROWN, David, FELLOWS, Noah, JONES, Edward, and BROWN, William.—This invention relates to the manufacture of nails, railway spikes, and gas-tube fastenings, and to the machinery employed. It consists—

In making nails etc. "from bars or plates of iron or steel rolled " of such figures or sections that by cutting the said bars or plates " transversely, single nails, railway spikes, or pins, and gas-tube " fastenings are produced, and rolling nail bars or plates of such " a figure or section that by cutting the said bars or plates trans" versely two nails are produced at each cut, which nails are " either separated by the act of cutting or remained joined " together at their heads by a slight junction, and may afterwards " be separated."

Making "nails from bars, plates, or rods of iron or steel rolled " of such a figure or section that they have in longitudinal sec" tion the figure of a series of headed nails joined together, either " head to head and point to point, or head to point, or from bars, " plates, or rods of iron or steel having in longitudinal section " the form of a series of brad nails joined head to point."

Manufacturing "brad nails, in which the head is situated on " one side only of the nail; the nails or nail strips from which " the said nails are made being rolled in the said machinery by " preference from the billet or pile."

[Printed, 10*d*. Drawings.]

A.D. 1861, April 10.—Nº 885.

ROGERS, William Rodriques.—This invention relates to the manufacture of dowels from wrought iron round, square, or polygonal rods, square rods being preferred for soft wood. These dowels carry at each end a series of jagged teeth or barbs, cut, when square rods are used, at intervals along the angular corners, the jagged teeth along each end in all cases inclining towards the midlength of the dowel. The teeth are to be struck up out of the metal of the rod after the manner of cutting the teeth on rasps. " In order to apply the dowels it is first requisite to drill accu" rately corresponding holes into such parts of the pieces of wood " intended to be secured together as are intended to form the " abutting faces, such holes being just so much smaller in diameter " as to insure a good hold of the wood without any undue ob-

" struction being offered to the insertion of the dowel." The dowels are to be forced into the surfaces they are intended to fix together by pressure, and by such means commonly used by carpenters to draw or tighten up their frame work previous to securing their joints, and an apparatus adapted for this purpose is recommended by the patentee, for which, prior to the date of filing this specification, he had obtained provisional protection, bearing date August 7, 1861.

[Printed, 6*d*. Drawing.]

A.D. 1861, April 13.—N° 917.

ABEL, Charles Denton.—(*A communication from S. Menans.*) —This invention, relating to a machine adapted for forging nails, operates by means of four dies which form the shank of the nail, and one hammer die which forms the head. The four dies are arranged on the same plane, moving relatively at right angles in such manner that the end of each die abuts against the side of the next, thereby forming a central opening which is occupied by the nail in process, the operating contiguous ends of the dies being appropriately formed for giving the tapering shape to the nail and finally to cut it off the rod. The nail rod in a heated state is thrust by an adjustable feeding apparatus through the opening between and slightly beyond the dies, which close upon it and squeeze or mould it into form, and at this moment the projecting end is struck by a heading punch, which is carried by a sliding ram or hammer, the sudden forward movement of which is effected by a spring, and the return motion by a cam on the main shaft. The compound die holder consists of two frames one movable and one fixed, and to these frames two of the dies are respectively fixed; the other dies move in grooves and are actuated by inclines and wedges, in accordance with the position of the frames or die holders.

[Printed, 10*d*. Drawing.]

A.D. 1861, April 20.—N° 981. (* *)

NOIROT, Jean Baptiste Jules.—" An improved process for " manufacturing India-rubber pipes."

This invention " consists of a standard apparatus, which is " composed of two flatting cylinders turning towards one

" another and compelling the mass being prepared and thrown " into a hopper to pass through a gauge plate with central core, " fitted beneath in such a manner that it shall be moulded & " drawn into tubes without any cementing of indefinite length, " and of any diameter required."

"For obtaining washers it suffices to section the tubes trans- " versely; for sheets I apply longitudinal draw plates, which when " smooth will yield smooth sheets, and yield grooved products " when they are formed with grooves thereon."

[Printed, 6*d*. Drawing.]

A.D. 1861, April 27.—N° 1066.

PARSONS, William Henry.—This invention relates to machinery adapted to the making of nuts, bolts, and rivets. The apparatus for making nut blanks consists of "a punch of a " section corresponding with the hexagonal or other form of the " intended nuts is used, by which the end of a metal bar or rod " is upset and pressed into a hollow die of a corresponding " section; within this punch there is a cylindrical punch, which, " when the hexagonal or other formed punch has acted, is caused " to be protruded so as to punch a hole through the metal which " is within the die, and by so doing the bar or rod to which the " enlargement has been previously made will be severed from the " enlargement, which is then a perforated blank, suitable for " being formed into a screw nut. The two punches receive their " motion by suitable inclines formed on" a "face cam . . . . . . " or by other suitable means. In drawing back the punches from " the interior of the die, the nut blank comes out from the die " with the punches, but when the interior punch is drawn within " the exterior punch the nut blank will fall off. The die is formed " of two parts, one of which is moveable and is acted on by a " cam in such manner as to close the two parts of the die when " the end of the bar or rod has been passed into the die a proper " distance, and the metal will be held securely from being pushed " back by one end of the die, whilst the punches come forward " and upset the end of the bar or rod into the die; but such " holding will be slightly released when the inner punch com- " mences its movement beyond the outer punch, so that the bar " or rod can move back as the end thereof is punched out from " the metal in the die to form the hole in the nut blank. When

" making bolts or rivets a cam is applied on a shaft or axis, suit-
" able for acting on the moveable part of the die (which is in two
" parts) so as to cause it to cut off the end of a rod or bar of
" metal, and to grasp and hold it whilst having a head or enlarged
" end formed thereon. On the same shaft or axis there is a face
" cam, which is arranged with inclines to force up the punch, so
" as to form the desired heads or enlargements to the bolts or
" rivets, and there is also a cam on the same shaft or axis, with
" inclines arranged to move back the punch after the head or
" enlargement has been formed."

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1861, May 8.—N° 1161.

MASSIAUX, Jean Thomas.—This invention relates to the manufacture of nails and brads, such as are cut from suitably rolled metal plates, and afterwards headed by appropriate dies. These nails are cut transversely from the ends of the plates which have flanged or thick edges on one or both sides, the intermediate surface of such plates being flat and of uniform thickness. This thickening of the edges of the plates is produced in the rolling process, for the purpose of providing additional metal to form the heads of the nails, which are cut therefrom by cutters arranged to operate upon the plate alternately at different angles, one cutter forming the heads of the nails it cuts off from one side or edge of the plate, and the other cutter from the opposite side. The finished form is given to the nails by a presser or squeezer block and two movable pressers, which advance horizontally towards each other and act in conjunction with the squeezer block, the head being finished by a vertical blow from a heading die.

A variety of nails differing in size and form are exhibited in the drawing, and some of such nails have diamond points.

[Printed, 8*d.* Drawings.]

A.D. 1861, May 8.—N° 1166. (* *)

HUNT, John Rolfe.—" Improvements in the manufacture of
" gutta percha and compounds thereof with other matters and
" substances."

The object of this invention is the production of a flexible material which shall be well adapted for being employed in the *manufacture of* pump buckets, valves, and washers, and other articles. Such a material is produced by "mixing or compounding " vulcanized india-rubber in a crushed or ground state with masti- " cated gutta percha in a doughy state, in the proportion of one " pound of vulcanized india-rubber to two parts of gutta percha; " also, if desirable, mixing therewith arrowroot in the proportion " of about four ounces of the arrowroot to every three pounds of " the compound of vulcanized india-rubber and gutta percha; I " then work this compound into a mixture until it is in a fit state " to roll into sheets."

[Printed, 4*d*. No Drawings.]

A.D. 1861, May 11.—N° 1197. (* *)

WILSON, William.—"Improvements in the manufacture of " wooden keys and treenails for railways and shipping, and in " machinery employed therein." The improvements in keys consist in sawing and planing them taper, by improved machinery, which ensures uniformity in size and shape, and an easy entrance into the chair.

The improvements in treenails consist in making them parallel three-fourths of their length, and then taper or conical to fit the chair, the head of the treenail to be convex.

"I subject the wood (oak, elm, or other kind) to a chemical " process by boiling in linseed or other oil until thoroughly " saturated, and then dry it by heat or otherwise; thus prepared " they stand driving much better than any now in use, and after " being driven into the sleeper are caused to expand. The action " of the sun on the keys also produces no contraction."

The improved machinery for manufacturing the keys consists of a frame carrying a cutting tool, "which frame is made to move " up and down on standards to bring the cutting tool to act upon " the wood; the wood itself is supported against a guide or guage " upon a table hinged in such manner that the position of the " wood may be altered to obtain the cut required by inclining the " table."

[Printed 10*d*. Drawing.]

A.D. 1861, June 1.—N° 1369. (* *)

WIGZELL, Montague.—(*Provisional protection only.*)—"An " improvement in the form of iron, steel, brass, copper, and other " metallic alloy for making nails, spikes, bolts, screws, and other

" similar driving articles, both plain and twisted." "The im-
" provement consists in drawing, rolling, cutting, forging, press-
" ing, stamping, and indenting iron, steel, brass, copper, and
" other metallic alloy, in the form of bars, rods, sheets, strips, and
" wire, so as to give them a fluted, grooved, or indented form
" (whilst hot or cold, of any shape, size, diameter, or thickness,
" that may be required), for the purpose of making nails, spikes,
" bolts, screws, and other similar driving articles, and also for
" twisting them into long or short lengths for the purpose of manu-
" facturing the twisted and fluted (and fluted without being
" twisted) nails and other similar driving articles of a fluted,
" grooved, or indented section."

[Printed, 6*d*. Drawing.]

A.D. 1861, June 6.—N° 1420.

COLES, Henry Thomas.—This invention relates primarily to the construction of breech loading fire-arms, ordnance, and details of gun locks, and incidentally to a double screw, which forms a part of the breech-loading apparatus, and is applicable to other purposes, such as fastening "timbers, flooring, and all substances " whatever together in lieu of nails, bolts, and common screws." The breech is a flat circular turning piece segmentally reduced to the sight line on the top, and radially perforated to receive the charge; it is fitted to fill and capable of being partially turned in a flat circular recess or chamber, formed in the solid part of the stock or solid material of the gun, directly opposite to the end of the barrel and open at the top, so that when loaded and turned down, the charge chamber in the breech is brought lineally into position with the axis of the barrel, and for the purpose of reloading, the breech is turned up so as to bring the end of the charge chamber opposite the opening in the top of the recess. Various contrivances are devised for turning and fixing the breech, and amongst other things is a double screw. This screw is a short piece of metal screw-threaded at each end, and instead of a head it has at its midlength an annular projection or collar furnished with teeth, to be acted upon by a pinion for the purpose of turning it, or it may be turned by other means, and the diameter of the central intermediate part may be the same or less than the two ends. A single screw is also described combining a "self-" cleaning" metallic brush, which is fixed in the termination of the thread, projecting slightly from its periphery.

Modifications and manifold devices relating to elevating, depressing and working ordnance, manufacturing gun locks, and a variety of details of gunnery are described and illustrated.

[Printed, 1*s*. Drawings.]

A.D. 1861, June 7.—N° 1446.

BENNETT, Samuel, the younger. — (*Provisional protection only.*) — This invention relates to the manufacture of nails, washers, and various other articles, which are cut or stamped out of plates made of scrap or waste pieces of metal tubing. Pieces of waste iron tubing are, when heated, slit longitudinally by a rotary cutter, then opened out, and if necessary reheated and passed between rollers to flatten or reduce them to the required thickness to suit the purpose for which they are to be utilized. Brass or copper scrap or waste tubing is treated in the same manner, excepting that the heating process, when the metal or alloy is ductile, may be dispensed with.

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 18.—N° 1571.

JOPLING, Thomas Taylorson.—This invention relates to machinery adapted to the manufacture of bolts, spikes, screw-blanks, and rivets, by means of an intermittently revolving disc or die holder, the outer surface of which is suitably formed to receive six socket dies, which are hexagonally circumposed at corresponding radial distances from its fixed horizontal axis, on which it is caused to turn at intervals by means of ratchet teeth on its periphery, each move one-sixth of a revolution, in order to bring the dies in succession into co-operation with a heading die, the holder of which is carried by a cross head that obtains reciprocating motion to and from the dies by means of a cam. The end of the metal rod out of which the bolts or articles are made is fed during the stopping intervals of the die holder through a stationary guide or opening into the die then coincident therewith, and a revolving arm, which operates upon the ratchet each revolution to give a forward movement to the die holder, also by means of a cutter severs the piece just fed to the die, from the rod, sufficient length to form the head being left projecting. The loaded dies by turns are thus brought round and rest exactly opposite the header, which operates upon the piece of metal in each as they severally come round, and the next move brings them successively into position coincident with the movements of a rod, which by turns pushes the finished bolts or articles out of the dies. When operating on heated metal, the dies are kept cool by water running through internal channels.

[Printed, 1*s*. Drawings.]

A.D. 1861, July 1.—Nº 1672.

POTTS, Ferdinand, and COX, Richard. — This invention relates more particularly to the casting of metal feet, knobs, or joint pieces, on to wrought iron or other metal tubes, employed in the manufacture of iron and other metallic bedsteads, the object being to prevent the influx of the molten metal into the tube, and confine it to within a short distance of the end or ends during the process of casting. This is effected by the use of metallic packing, consisting of circular pieces of sheet metal flanged round on one side so as to form shallow cups, which fit to the size exactly of the internal bore of the tube, into the ends of which they are driven a short distance, so as effectually to cut off all communication with the interior. These small circular pieces of metal, either in the form of plain discs or cupped, are pinched out of thin metallic plates by a kind of punching machine, mounted horizontally on a brickwork foundation, and specially adapted to the purpose, and also applicable to the making of metallic washers.

This machine, constituting the second part of the invention, operates by means of a socket die fixed in an adjusting die holder attached to or forming a portion of the end of the frame, and a movable punching die fitted on the end of a plunger that has reciprocating motion from a crank; and according to the nature, form, or style of the articles required to be made, so must the dies be fashioned.

[Printed, 10*d*. Drawings.]

A.D. 1861, August 10.—Nº 1998.

WIGZELL, Montague.—This invention relates to a machine devised for twisting ordinary nails, and similar parallel or tapering driving articles, plain, fluted, or grooved longitudinally in part or throughout. Mounted in the machine is a series of mandrils, and on each mandril, for the purpose of revolving it, is fixed a small tooth wheel; these wheels engage with a rack, which obtains a to-and-fro reciprocating movement from a crank motion by means of a connecting rod; one end of each mandril carries a screw which enters through a fixed nut, and the other end of each mandril is provided with a recess, which receives the shank of the nail. The heads of the nails are held by grippers, or the shanks are passed each through a slotted hole in pieces respectively opposite the end of each mandril; these guide pieces prevent the nails from turning when by means of the racks the mandrils are caused to rotate, so that the nails become twisted into a spiral form, the screw at the back end of each mandril causing it whilst revolving to slide backward, and by these means as the nails are slowly drawn out of the mandrils they are gradually twisted throughout their whole length.

[Printed, 1*s*. Drawings.]

A.D. 1861, August 10.—N° 1999. (* *)

WIGZELL, Montague. — "Improvements in machinery or
" apparatus for making plain twisted nails, spiral fluted nails,
" and other similar driving articles of a twisted or spiral fluted
" form throughout or in part."

"The machine or apparatus is capable of making one or more
" nails at any number of revolutions or parts of a revolution of
" its driving gear, and when the bars, rods, strips, or wire of iron
" steel, brass, copper, or other metal or metallic alloy are placed
" in the machine, they are drawn into their required position be-
" tween the grippers at intervals by machinery or by hand, then
" gripped and cut off into the required lengths, and held by jaws
" which are placed on the ends of traversing and rotating man-
" drils, then headed by hammers or press rods and twisted by the
" traversing and revolving mandrils, which draw the pieces of
" iron when cut as herein described through rollers in front of
" the grippers, so as to give them the required number of twists.
" The nails when thus made drop out of the jaws which open
" when the mandrils have travelled their full distance."

The machine is constructed as follows:—" A driving shaft is
" arranged on a suitable framework or bed, and is driven by
" driving gear, to which motion can be given by any known
" motive power; from the said driving shaft, by means of cambs
" or cranks the mandrils are made to travel to and from the

" grippers, and upon the ends of the mandrils are self-acting jaws " which hold the nails and form dies for the heads of the nails, " and in the centre of the mandrils are press rods, around which " the mandrils are made to rotate by means of friction rollers, " revolving cambs, or conical clutches, upon a shaft to which " motion is given by the driving shaft. The grippers are worked " by a camb fixed on the shaft which rotates the friction rollers, " and the feeding apparatus composed of revolving cambs and " rollers is geared by wheels and worked by the said shaft, the " whole being arranged on requisite bearings and frame or bed."

[Printed, 10*d*. Drawings.]

A.D. 1861, August 30.—N° 2154.

PENROSE, Robert.—(*A communication from John Peace.*)—(*Provisional protection only.*)—"This invention relates to stocks " and dies for screwing or forming the threads on gas pipes, " bolts, or similar articles, and the improvements consist in having " the stock or frame part of the apparatus so formed or constructed as to become a guide to the die, and having the die " which is made taper in the cutting part placed at a small distance from the side of the guide, but parallel to and concentric " therewith. By means of this apparatus screws may be cut at " one operation with more accuracy and greater facility than " heretofore."

[Printed, 4*d*. No Drawings.]

A.D. 1861, September 17.—N° 2319. (* *)

DAVIES, George.—(*A communication from Charles Alexandre Louvrier.*)—" Improvements in machinery or apparatus for the " manufacture of horse-shoe and other nails."

An apparatus by which horse-shoe and other nails are rolled and forged simultaneously. Two sectors serve the purpose of rolls, which form the stem or body of the nail, drawing it out to the required dimensions; its head is formed by a punch. The two sectors, mounted on pivots, are caused to oscillate, and their rolling surfaces are formed to roll the body of the nail. Two sliding hammers are placed at right angles to the former, working one against the top of the lower sector, and one against the bottom of the upper sector, enclosing a rectangular space between the four surfaces. One of the sectors has a lateral motion, whereby it follows the movements of the hammers as they approach and recede from each other; a rod of iron placed in the quadrangular space is slightly reduced, and held between them while the punch forms the head of the nail. The rolling movement of the sectors forms the stem or shank of the nail. The sliding hammers are opened and closed rapidly by a cam, and squeeze and forge the iron in the reverse direction. Any required number of blows may be given by these hammers during one rolling movement of the sectors.

[Printed, 8*d*. Drawing.]

A.D. 1861, Sepember 21.—N° 2366.

PARKES, Alexander.—(*Provisional protection only.*)—This invention relates to the employment, in the manufacture of castings, rods, bolts, nails, rivets, and sheets, of alloys of copper and zinc, to which is added from a quarter to two per cent. of either tin or aluminium. The proportions of the copper and zinc may vary from an equal quantity of each to forty per cent. of the purest zinc, and sixty per cent. of copper. "Within the above " proportions and limits the metal will cast well, and is very " suitable for making castings of various kinds, and the cast " ingots will roll at a red heat into rods, bars, and sheets, and " such rods, bars, and sheets may be then worked up into various " articles in a cold state as well as at a red heat."

[Printed, 4*d*. No Drawings.]

A.D. 1861, Sepember 26.—N° 2399. (* *)

FLEETWOOD, Daniel Joseph.—(*Provisional protection only.*) —"An improvement or improvements in nails." The invention " consists in making nails having on their cylindrical or tapering " bodies one or more ribs or longitudinal projections, the said " ribs or projections being either straight or slightly twisted " about the axis of the nail. The bodies of nails made according " to my invention have, in cross section, the figure of a circle " with one, two, or more arms situated radially upon the said " circle. When I give the ribs or projections a twisted or screw-" like figure, I make the twist so slight that it does not interfere " with the driving of the nail. Each of the said ribs need not " pass more than a quarter round the circumference of the " *cylindrical or taper* body of the nail."

"Nails may be made according to my invention either of brass
" or iron, or other metal or alloy, and may be used for sheathing
" ships and vessels, and in place of ordinary nails. My improved
" nails are driven with as great facility as ordinary nails, and hold
" with great tenacity."

[Printed, 4*d.* No Drawings.]

A.D. 1861, October 1.—N° 2447.

SCOTT, JOHN WILLIAM.—This invention relates to tools and apparatus adapted to the manufacture of rings, washers, and other articles by punching or stamping several at the same time out of leather, cloth, or other material, by means of a concentric series of circular cutters fixed to a plunger, and combined with intermediate annular pistons connected to a cross bolt or bar, which is carried by an external ring. The plunger with the cutters is forced down upon the material by a screw or other press, and when the plunger raises the cutters, the annular pistons are depressed, whereby the rings, which have been cut and remain in the annular spaces between the cutters, are driven out by the pistons, and the same action of the pistons is repeated after every descent of the cutting tool.

Laces are cut out of a circular space of the material by means of a cutter made in the form of a plane volute scroll.

[Printed, 6*d.* Drawing.]

A.D. 1861, October 9.—N° 2520.

DAVIES, GEORGE.—(*A communication from Thomas Randolph Taylor.*)—This invention relates to machinery adapted to the manufacture of shoes for horses and other animals, and is applicable to the making of nuts and washers. The frame of the machine is supported on a strong bed plate, and carries three horizontal shafts trigonally arranged, and caused to revolve at a uniform speed by means of a tooth wheel on each, gearing into an intermediate tooth wheel mounted on the driving shaft; the upper shaft by means of a crank arm gives vertical motion to a slide which carries at its lower end two recessed swinging jaws that hold and partly shape the shoe externally. The other shafts give longitudinal motion respectively to two horizontal shafts or bolts, which bring two dies into co-operation beneath the swinging jaws. One of these dies is appropriately shaped to form the shoe internally, and the other externally, and in combination with the jaws, they mould the piece of heated bar to the form of a shoe, turning down the end to form the heel pieces, and raising a toe tip in front. The bar is fed into the machine by hand, and cut off to the required length by a cutter operated by the reciprocating movements of the part which carries the internal shaping die, and the groove or recess and the nail prints are made by the end of the external die.

The machine modified in the form of the dies may be adapted to the manufacture of nuts and washers.

[Printed, 8*d*. Drawing.]

A.D. 1861, October 9.—N° 2524.

RUSSELL, John James.—This invention relates to hand stocks and dies for screw cutting. "The central part of the stock is " made with a circular opening or recess of suitable dimensions " to receive a die, which in place of being made in two pieces, as " is ordinarily the case when making dies for the common hand " stock, is made of a single piece, and of a circular or cylindrical " form. The die is retained within the recess or opening in the " stock by means of the projecting heads of two screws screwed " into the stock at opposite points of the diameter of the die. " The die is of steel, and is made with cutting edges projecting " inwards at four points at equal distances apart on the inner " circumference of the die, and these cutting edges are made by " preference somewhat bell-mouthed where they first begin to cut " or tap the end of a tube or rod. A die thus formed will admit " of being again and again reformed after it is worn away and " blunted by simply softening it and hammering its exterior " opposite where two sets of the projecting cutters are situated, " so as to force such opposite cutters towards the centre of the " die, and then hammering it opposite where the other two sets " of cutters are situated, so as to drive those cutters also towards " the centre. The die is then to be made complete by screwing " in the proper screw tap and by again tempering the die. In " order to ensure the end of a tube or rod being correctly tapped, " a hand stock is formed with a suitable hollow or proper holder " below where the die is received, in which holder a thick disc or " plate perforated with a hole corresponding with the external " diameter of the tube or rod to be tapped is placed and held;

" through this disc or plate the end of the tube or rod is passed, " which insures that end being correctly held to the die."

[Printed, 10*d.* Drawing.]

A.D. 1861, October 11.—Nº 2541. (* *)

RICHARDSON, ROBERT.—(*Provisional protection only.*)—" Improvements in the manufacture of railway fastenings, and a " mode of preparing rails and fish plates to receive them."

These improvements relate to " the manufacture of spikes, bolts, " and screws used as fastenings for rails and fish plates on railways by rolling into shape and cutting them without the aid of " a second heating, and also in an improved manner of preparing " rails and fish plates to receive the said spikes, bolts, and screws " by punching the holes of the rails and fish plates in a conical " shape with any number of sides not less than three."

[Printed, 4*d.* No Drawings.]

A.D. 1861, October 12.—Nº 2552. (* *)

NELSON, HENRY.—" Improvements in machinery or apparatus " for punching washers for throstles and other similar purposes."

" This invention consists of two rollers or cylinders revolving " in suitable bearings, between which the cloth or material to be " punched passes. On one of the said rollers or cylinders is " one or more projecting cutters, so that as the material to be " perforated comes in contact with each cutter, the requisite hole " is punched; and to cause the material to pass through or " between the rollers regularly without slipping, one or both of " them are grooved or fluted, and at the front of the apparatus " any suitable guides may be fixed to keep the material in a " straight direction. The required distance of the perforations " is regulated by the diameter of the roller, and consequently the " distance of the punches asunder. Motion may be given to the " rollers either by hand or power."

Printed, 10*d.* Drawing.]

A.D. 1861, November 14.—Nº 2869.

WIGZELL, MONTAGUE.—This invention relates to mechanical apparatus adapted for " moulding and casting twisted nails, " spiral fluted nails, bolts, and screws for sheathing vessels, ship- " building, and other purposes." The operating parts of the machine are disposed between upright standard frames, which carry a crosshead supported on vertical guides. The pattern screw nails, etc. arranged in a series of rows or otherwise, are carried depending from the underside of a horizontal plate, made capable of moving up and down between the guides by means of a rack and pinion. The upper end of each pattern screw is turned down to a shoulder to fit loosely into holes made through the plate, and they are screw-threaded at the top end to receive a nut and washer, whereby they are severally secured, each having free liberty to turn on its axis. The lower end of each pattern screw is the part which enters the moulding sand, and constitutes the model of the intended screw-nail or twisted bolt, &c. about to be cast, and upon the shank of each pattern screw a master thread is cut, corresponding to the pitch of the model. All the pattern screws pass down through a corresponding series of holes in a horizontal plate which is fixed between the standards, the holes being tapped to receive the master threads on the shanks of the models or patterns, and as the threads incline to an angle of about 45°, the patterns are caused to turn in either direction when the plate which carries them is either lowered or raised by the rack and pinion. The moulding boxes filled with sand are severally slid on a carriage to beneath the pattern screws and raised by an eccentric, so as to press against the under surface of the horizontal tapped plate, and when the model plate is lowered, the patterns screw into the sand, and unscrew when the plate is raised and the patterns withdrawn.

[Printed, 6*d*. Drawing.]

A.D. 1861, November 16.—N° 2881.

GRINT, JAMES.—(*Provisional protection only.*)—This invention relates to the manufacture of pegs and nails or similar fastenings of wood, bone, metal, or other material having sharp barbed points, and is to be employed for uniting the soles of boots and shoes and other substances. The head or after end of these fastenings is made flat and is enlarged from the body in regular tapering or curved lines, so that they cannot be readily withdrawn, nor can the substance in which such fastenings are inserted be readily drawn over the head. "The pegs or nails may be further split "up, and have a constant tendency to open thereat whereby they "will hold more securely. I also sometimes make them pointed

" and barbed at both ends, in which case it is partially driven " into one substance and the other substance placed upon it, " when the entering and driving of both ends takes place simul" taneously. I prefer to punch these pegs or nails from a sheet " of metal, in which case they are square or rectangular in cross " section, but other shapes and methods of making may be " resorted to."

[Printed, 4*d*. No Drawings.]

A.D. 1861, December 6.—N° 3058. (* *)

BAILEY, JOHN, and **BAILEY**, WILLIAM HENRY.—This invention, relating to vacuum, pressure, and speed gauges, consists, 1, in the attachment of a knife-edged pivot to the weight employed in such gauges, so as to act as a lever. The ordinary india-rubber or metallic diaphragm is employed to press against the piston in the usual manner. The knife-edged pivot rests upon a semi-circular bearing at the bottom of the link which connects the piston and weight, so that a delicate motion almost devoid of friction is obtained; the ordinary alarm and safety valve may be combined with this gauge. 2. Consists in the application to spring gauges of a regulating lever arm connected by a link to the piston, the top of which is in contact with the spring. 3. Relates to the employment of a lever in heat gauges, and steam and water traps. The end of this lever is in contact with the flange of a metal tube, through which the steam and water pass; the expansion and contraction of the tube operates upon the lever and indicates by means of a wheel and pinion in connection with the index hand the degree of temperature. In steam or water traps the lever operates a valve which lets off an amount of steam or water in proportion to the degree of temperature. 4. Relates to ascertaining the speed of any body in lineal or rotary motion, by means of an ordinary ball governor, actuated by such moving body. A rod is attached to the sliding sleeve, which on rising presses the rod against a lever attached to a wheel, which gears into the finger pinion, thereby indicating the exact speed on the dial. This arrangement is modified, whereby the indicator is actuated by either a vibratory or revolving motion. 5. Relates to the use of papier maché in the manufacture of dials and cases and to the use of aluminium or its alloys for diaphragms, screws, and other details liable to oxidation.

[Printed, 1s. Drawings.]

A.D. 1861, December 12.—Nº 3111.

SEARLE, Richard.—The first part of this invention relates to the application of zinc or galvanized iron treated with mercury, to sheathing for ships, marine erections and other buildings, and to the preparation by the same process, of bolts, nails, and fastenings used for marine and other purposes. The zinc or galvanized plates, bolts, nails, or articles of the same or other metal, are submersed in a bath containing a dilute solution of sulphuric or other suitable acid, to which is added a portion of mercury. The acid removes all oxidation from the surface of the zinc or metal, and prepares it to enter into combination with the mercury, which by by means of a woollen or other cloth is rubbed over every part of its surface whilst in the bath, any excess of mercury being carefully removed afterwards. When zinc or metal so prepared is used for ships' sheathing or marine fastenings, a portion of copper is placed in partial or actual contact with it, thereby to produce a weak galvanic circuit, the strength whereof being determined by the relative proportions of the metals employed.

The second part of the invention relates to keeping clean the bottoms of ships sheathed with iron, by means of a weak galvanic current, produced by suitable proportions of copper or brass applied either externally or internally to the surface of the metal.

[Printed, 4*d*. No Drawings.]

1862.

A.D. 1862, January 14.—Nº 106.

GORSE, William.—This invention, relating to machinery employed in the manufacture of cut brads, consists of certain arrangements of parts for guiding and giving a swivel motion combined with a reciprocating lateral movement, to the strip of iron from which the brads are cut, whereby the end of the strip is presented alternately to the two side cutters obliquely, the object being to secure uniformity in the size of the bills or heads of the brads, which it is stated cannot be effected by machinery of the ordinary kind. The metal strip is laid in a trough which is advanced to the cutters by a cord that is drawn over a pulley by a weight; the trough is swivelled by a bell crank lever, and the end of the strip rests *on a lateral* sliding bar or "elastic guide" between two studs, one of which is fixed and the other capable of yielding, the bar being moved direct by a side lever in one direction, and returned by a spring. By this means it is stated, the regular feeding of the strip may be relied on, and bills or brads may be cut with heads of uniform size, altho' the strips may vary in width.

[Printed, 8*d*. Drawing.]

A.D. 1862, January 21.—N° 156.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Carl Gustaf Gustafsgon.*)—The object of this invention is an improved arrangement of the operating parts of nail making machines, in which two pairs of compressing rollers, respectively for tapering and shaping the ends of metal rods are employed in combination with a cutter and a heading die which, whilst the ends of the rods, first shaped by the rollers, and cut off by the cutters, are held by gripping dies, strikes up heads on such tapering pieces, and forms them into nails or spikes. The rollers employed of which there are two pairs, one pair for pointing, and the other for shaping the end of the rod, are made in two parts bolted or screwed together, the contiguous edge of the periphery of each part being filed away, forms a circumferential groove transversely varying in shape and area, constituting moulds corresponding to the intended size of the nails. These two pairs of grooved rollers have a forward and backward movement on their axes. The end of the metal bar, heated and preferably square, is passed between the shaping rollers and the pointing rollers, the first pair only acting upon the rod as it enters the machine, by moulding it to the form of a nail shank; the moulded end passing on is gripped by a pair of tongs whilst cut off by a cutter, and held by them during the process of heading, which is performed by an appropriately formed dye, whilst the rod, from which the nail piece has been severed, is moved back by the reverse action of the mechanism, and the cut end pointed by the pair of pointing rollers, preparatory to its next entry between the shaping rollers, and the succeeding operation of the cutters and the heading die.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1862, February 8.—N° 336.

WEBSTER, JAMES.—(*Provisional protection only.*)—This invention relates to the "manufacture of certain descriptions of

" nails, bolts, spikes, and pins " applicable for sheathing ships and ship building, securing railway chairs, and similar uses. The nails, bolts, and spikes, are made triangular in transverse section and slightly twisted in the direction of their length, so as to give them a spiral form, which whilst such form offers no impediment to the driving of such nails, it makes them difficult to draw, consequently the nail has a much firmer hold of the timber in which it is driven, and is less liable to work itself out.

[Printed, 4*d*. No Drawings.]

A.D. 1862, February 14.—N° 401.

SMITH, William Ford, and COVENTRY, Arthur.—(*Provisional protection only.*)—This invention relates to apparatus applicable to turning lathes, for the purpose of cutting screws. It consists of a circular disc, on one surface of which are cut, relatively at equal distances, three radial grooves. The dies employed are notched to receive eccentric curved inclines, formed on a loose ring concentrically fitted to the disc, whereby when the ring is turned in one direction, the dies are caused to converge, and close upon the screw-blank or rod whereon they are to cut the thread, and when the ring is turned in the opposite direction, the dies diverge and the screw is set free, the dies and ring being secured in their places by a face plate. The disc is appropriately mounted on the sliding carriage of the lathe, and has a central hole concentric with the centre of the lathe spindle. It is stated, that screw threads of accurate pitch can be cut at one operation of the dies, and that by removing the dies and substituting cutting tools, the lathe is rendered capable of turning or sliding shafts and similar articles.

[Printed, 4*d*. No Drawings.]

A.D. 1862, February 15.—N° 405.

AVERY, William.—This invention relates to machines employed in the manufacture of screws, and to a feeding apparatus applicable to such like machines, and also to machines employed in the making nails, pins, and rivets.

1st. Machine capable of ready adjustment for making screw-blanks of different lengths. The sliding block which carries the heading die is supported by and works against the end of a strong adjusting hollow screw, which forms a part of the connection with the crank couplings, the cutting-off piece being worked by a connecting rod jointed to a lever arm on the crank shaft, and acting in conjunction with a cutting edge on the holding die. The adjustment of the heading punch is effected by a screw instead of the ordinary packing. The required intermittent motion of the rollers which feed the wire into the machine at regular intervals is, instead of using the ordinary ratchet and pawl, performed by a reciprocating arm which carries a jointed piece; this piece operates in one direction as a chock or wedge upon the plain periphery of a disc fixed on the spindle end of one of the feed rollers which are thereby caused to rotate a portion of a revolution every forward movement of the arm which is loose upon the spindle, and the chock is free to slide each return movement, the length of motion being adjustable. This feed apparatus is also applicable to machines employed in the making of nails, rivets, and pins.

2nd. Feeding apparatus for supplying screw-blanks to leading-ways connected with machines employed in the subsequent processes of turning, nicking, worming, and pointing. The blanks are contained in a stationary hopper, and the instrument employed is a kind of two-prong fork, to which the requisite motions are given in succession for forcing the fork amongst the blanks, and then assuming the requisite positions for lifting one or more each move and transferring them to the leading ways, the blanks falling between the fork prongs and hanging by the head, are caused to slide on to the ways by a tilting motion of the fork.

3rd. Machine for shaving and nicking the heads of screw-blanks, operates by means of a rotating circular saw, which after the blank head has been shaved by a cutting tool and has ceased to revolve, is caused to advance against the head in a line with the axis of the blank, which is held during both processes by the same pair of clams, which are carried on the end of a mandril or shaft, that rotates whilst the cutting tool is shaving the blank-head, but is made to rest during the subsequent nicking operation, after which the saw is retired, the mandril set in motion, and the cutting tool again advanced to smooth the head after the saw. The blank after the three successive processes is ejected from the clams by a lever and spring.

[Printed, 2*s*. 2*d*. Drawings.]

A.D. 1862, March 14.—N° 701.

QUINARD, ALEXANDRE.—This invention relates to a *machine designed for* making horse-shoe nails, which are cut from prepared iron plates or strips, whereon ribs or projections are raised by the rollers employed during the process of manufacture, the parts so raised furnishing additional metal for the nail heads. The prepared metal strips are presented to a pair of pressers or dies, and a descending cutter, co-operating with a cutting edge on one of the dies which is fixed to the bed plate, the other being movable, shears off a nail piece, which drops between into a recess formed in the contiguous end faces of the presser dies; the latter then close and grip the piece, the part cut from the rib in the prepared iron partly protruding from the dies in front of a heading or hammer die. A lateral sliding piece, the end of which carries an impress to mould the side of the head, slides in a grooved recess in the front side of the fixed presser die, and is advanced by a lever and cam, and the hammer die strikes almost simultaneously on the top of the head.

In this way the nails are cut off the strip, the shanks compressed or shaped by the presser dies, and the heads formed by the lateral sliding die and front heading die in rapid succession, without, it is stated, in any way impairing the metal, which preserves complete malleability.

[Printed, 10*d*. Drawing.]

A.D. 1862, March 18.—N° 753.

ILES, CHARLES.—(*Provisional protection only.*)—This invention relates to the manufacture of the metallic fittings employed in the construction of umbrellas and parasols, and to the jointing rivets employed; it consists—

1st. In the use of pairs of small impressed discs in lieu of the "top notch" pieces and sliding or "runner notch" pieces to which ordinarily are respectively jointed, by means of the annular groove and wire ring, the ends of the ribs and stretchers. These discs, by means of suitable dies, are impressed with a circumposed series of hemispherical recesses, and when two discs are fastened face and face together, they form between them a number of small spherical cavities. Those ends of the ribs and stretchers which are usually flattened and drilled for jointing to the notch pieces, are furnished with small spherical knobs which correspond to the size and must be capable of working free in the spherical cavities formed by the junction of the two discs, and by this means the ribs and stretchers are secured by what may be termed a series of ball and socket joints.

2nd. Relates to the "middle bits," whereby the stretchers are jointed to the ribs. These are cut out of sheet metal and the necessary projections raised by suitable dies; they are made to slide on the ribs, and are set firm in their places by pressure.

3rd. Relates to making the handles and tips, ornamented or otherwise, of china or vitrified material, also of hard cement and other substances capable of bearing a polish.

4th. The heads of the rivets or joint-pins used for jointing the stretchers to the middle pieces on the ribs are hemispherical, and when in their places heads are formed on their other ends, which are upset and rivetted by the pressure of suitable dies.

[Printed, 4*d*. No Drawings.]

A.D. 1862, March 27.—N° 859.

SMITH, William Ford, and COVENTRY, Arthur.—This is an invention relating, first to a screw cutting apparatus adaptable to slide and screw cutting lathes, and machines employed for cutting screws, and second to a new chuck which is applicable to turning lathes.

Screws are cut by means of three dies, fitted to slide in radial grooves formed relatively equidistant in the face of a disc, which has a central hole and is suitably mounted on the sliding carriage of the lathe, concentric with its centre. The dies are moved simultaneously either to or from the centre by eccentric curved inclines formed on a ring, which fits to the periphery of the disc, so that by turning the ring in one direction the dies are made to close upon the intended rod or screw, and when turned in the opposite direction the dies diverge and set it free, the dies and ring being secured in their places by a plate, which is fixed to the face of the disc. The slide carriage is dragged by the dies in common screwing, but when accurate pitched threads are required, the screw-cutting sliding gear is brought into operation. The dies after being cut in the ordinary manner, are rimmed out by a "tapering rimer," so that each thread cuts independently, one in advance of another. By substituting cutters in place of the dies, the apparatus is adapted to lathes for turning or sliding shafts and similar articles.

The improved chuck is employed in screw-cutting lathes and machines. It consists of a plate, which is screwed on the lathe *spindle and* carries a disc that has liberty to move diametrically, and to which the gripping jaws are fitted to slide at right angles, or two discs sliding relatively at right angles, one being attached to slide diametrally on the face plate, and the other carrying the gripping dies, may be employed.

[Printed 10*d*. Drawings.]

A.D. 1862, April 7.—N° 981.

SMITH, Titus.—(*Provisional protection only.*)—This is an invention of apparatus applicable for cutting and shaping screw bolts, and for other purposes.

"The cutting tool for shaping the body of the bolt, and squar-
" ing the bolt head, consists of a steel die with a hole through it
" of the diameter of the screw bolt, and one end is furnished
" with cutting edges. The head of the bolt to be operated upon
" is held in a chuck attached to a spindle, to which motion is
" given by steam or other power, and the cutting tool is pressed
" against the screw bolt by a rod acted upon by levers and weight.
" When the cutting tool is being pressed against the screw bolt
" the inner cutting edges reduce the body of the bolt to its
" proper diameter, and when the cutting edges come against the
" bolt head they square it up. As soon as the operation is com-
" pleted, the attendant, by acting on a lever, draws the cutting
" tool away from the screw bolt, which is then taken out of the
" chuck and another one put in its place to be operated upon in
" the same manner. The point of the screw bolt is then operated
" upon by a counter-sunk cutter, somewhat like the tool known
" as a rosebit, and a similar instrument is employed for rounding
" up or polishing the heads of the bolts."

[Printed, 4*d*. No Drawings.]

A.D. 1862, April 11.—N° 1045.

RIGOLLOT, François.—This is an invention of mechanical apparatus adapted for making metallic rivetting pegs, to be used in the manufacture of boots and shoes, and other purposes.

The "machine is composed, firstly, of a shaft carrying two
" eccentrics, on which are placed two connecting rods, which
" move the knives of a shears. Secondly, of a cam pulley keyed
" on the shaft. This pulley (which is entirely novel) has a groove
" passing twice round it, and crossing. The crossing gives a
" come-and-go motion to the slide block by means of a shuttle

" with steel spindle fastened to the said slide block by a cast-iron " piece. This pulley (which plays an important part) has for " main and essential object to render the oblique motion of the " carriages alternate, precise, and invariable, permitting the pegs " to be cut only when the carriages are absolutely stationary, by " which means pegs of a given number will always be of equal " length. A regulator placed at the side of the framing, aided " by a rod, serves to diminish or increase at will the oblique right " and left motion of the carriages by means of a screw, the framing " acting as a nut; a fly-wheel is keyed on the shaft. On the " framing are placed two metal plates, each carrying ten or " more carriages fixed to it by a spindle-forming pivot, and permitting " said carriages to move obliquely. On the framing is " placed a connecting rod, which transmits the oblique motion " from the right to the left side of the machine. Under the " framing are three pedestals or brackets, on which revolves the " shaft, which receives its motion from a motor by means of " gearing beneath the machine, which gearing carries a pulley " in connection by a band with the cam pulley herein-before " mentioned. The bands (of sheet iron or other metal) being cut " to a breadth regulated by the number or denomination of peg " required, they are placed in the carriages; these bands are " brought beneath the shears by means of two steel claws or " catches placed on each side within the carriage; these claws or " catches receive their come-and-go motion by means of two " small levers also placed on each side of the carriage. The " carriages are formed to receive metal bands of five or six " different breadths, that is to say, with the same carriages pegs " of five or six different numbers or denominations may be " manufactured."

[Printed, 10*d*. Drawing.]

A.D. 1862, April 16.—N° 1100. (* *)

STOTT, DAVID.—"Improvements in the manufacture of rings " from paper, millboard, or pasteboard, applicable for steam or " other pipe joints, bobbin ends, or other purposes, and in the " means or apparatus employed therein, which are also applicable " to the manufacture of rings from other flexible substances."

These improvements "consist in stamping or cutting out " *various sizes of* rings from one sheet, concentrically to each other

" by means of a series of circular or annular stamps, punches, or " cutting instruments applied or attached to any stamping, " punching, or pressing machine of sufficient strength, and actuating or motive power; by this means paper rings can be " produced with facility and regularity of size, and also with less " waste of material. Rings thus manufactured may be used for ' bobbin ends, which will be more durable than wood, as they " will not break by falling, and such rings may be applied to " other useful purposes. Cutting instruments of this con- " struction and arrangement may also be applied or used for " cutting sheet lead, gutta percha, or other flexible substances " into rings."

[Printed, 10*d*. Drawing.]

A.D. 1862, April 16.—N° 1109.

STANTON, JOHN.—This invention relates to machinery adapted to stamping and piercing metal washers and similar articles, the process being performed by successive operations. The machine comprises "two punches and their bolsters, the one set at an " angle of about sixty degrees with the others, but in gear with " each other; the metal having been supplied to the first punch, " a blank is struck out, this blank falls through an aperture on " the bolster, which aperture is provided on one side with an " inclined plane of stout glass or other suitable material, which " throws the blank to the bottom of a receiver below the bolster; " in this position the blank is caught by a grip or catch, which " retains it whilst the second punch perforates the blank; upon " the grip or catch receding, the washer falls out of the machine " completed at one operation. The two punches may be geared " together to work reciprocally by a connecting rod and lever, or " in any other suitable manner."

[Printed, 10*d*. Drawing.]

A.D. 1862, April 22.—N° 1168.

PUTNAM, SILAS SAFFORD.—This is an invention of a machine designed for forging horse-shoe nails and other articles. The machine operates upon the nail rod by means of two pairs of hammers, which strike alternately on the end of the nail rod, the hammers of one pair striking simultaneously at the opposite sides, and *the others top* and bottom. The hammers are attached to lever helves mounted in a kind of cruciform frame, and the extreme ends of the helves of each pair by turns are acted upon convergently by a revolving cam, causing the hammers immediately after delivering the stroke to separate, the sudden forward action for the blow being effected by the reaction of coiled springs. The end of the rod is presented by the workman in a line with the plane or meeting point of the hammers resting on a lever, the free end of which is furnished with a holding guide; this end of the lever has liberty to move sideways, and after the end of the nail rod has been drawn out by the hammers and tapered to the shape of the nail, by a lateral movement of the guide lever it is brought under a descending cutter, which co-operates with a fixed cutter on the frame block and severs the nail piece from the rod; during the latter operation the action of the hammers is suspended by a block piece which is interposed between them, and a gauge, which regulates the length of the nail, is brought into position by a treadle that is operated by the workman's foot. It is necessary that great care be taken to regulate the simultaneous action of the side hammers, which forge the shoulders under the heads of the nails. A supplementary spring is applied for regulating the force with which the hammers strike.

[Printed, 1*s*. 8*d*. Drawings.]

A.D. 1862, April 23.—N° 1181. (* *)

PRICE, James,—(*Provisional protection only.*)—" Improvements " in spikes for railways and other purposes, and in the mode of " manufacturing and securing the same."

" This invention . . . . . consists in manufacturing an ordinary " solid spike or pin, and then splitting it longitudinally for a " greater or less portion of its length by means of a circular saw or " shears," or if the pin is made of softer metal such as copper it may be cast with the split or bevelled points. " The two limbs " or halves thus formed are bevelled inwards at the point, which " causes their opening or separation when driven into the sleeper " or other timber. In order, however, to insure with greater " certainty the opening of the split end of the spike or pin," it is proposed " to use a small iron, metal, or hard wood wedge, cone, " pyramid, plug or ball, which is dropped into or inserted in " the hole to receive the spike, which hole is to be bored to about " the depth to which the solid portion of the spike will reach

" when driven home, and upon which the bevilled end of the " spike is driven, such wedge or cone serving effectually to open " or separate the split. In drawing the spike this wedge or cone, " which has previously been forced up to the extreme end of the " split, is generally drawn out with it, so that the extra width " given to the split portion of the spike must be drawn through " the small aperture formed by the neck of the spike or unsplit " portion."

[Printed, *4d.* No Drawings.]

A.D. 1862, April 26.—N° 1225. (* *)

LE SOUËF, Dudley Charles.—(*A communication from John Schuberth.*)—(*Provisional protection only.*)—" An improvement in " the manufacture of nails, bolts, rivets, screws, eyes, and split " keys or pins." This consists in making the head of " porcelain " or any other kind of earthenware, and when partially dried, a " hole is made in such head to admit the shank or other part " of the nail, bolt, rivet, screw, eye, or split key, or pin, which is " further fixed to the head by means of a cement composed of " quicklime, white of egg, and slack lime."

[Printed, *4d.* No Drawings.]

A.D. 1862, April 30.—N° 1269.

DAVIES, George.—(*A communication from Ernest Lambert.*)— " This invention relates to the application of malleable cast iron " to the manufacture of various nails for boots and shoes, and of " other analogous articles of nailery or ironmongery, such as " screws, tenter and other hooks, rings, hinges, and other similar " articles. These articles cast directly or otherwise in malleable " iron by the ordinary process are nevertheless not liable to be " broken by a small blow, and are capable of numerous applica- " tions in trade."

A great variety of cast iron nails and tacks, with heads and shanks of divers shapes, and similar other articles, applicable to many purposes, are exhibited in the drawings. Amongst these will be found in great variety, shoe and other nails, wall and other hooks, gate hinges, holdfasts, rings and staples, wood screws and screw rings, boot heels and sash fastenings. Also shoemakers' nails with striated or radiated heads and with novel forms having two points, planking nails, boot heels, and nails cast together, nails with triangular and other forms of shank, and a variety of nails with heads of divers forms cast on to wrought-iron shanks.

The object sought in regard to nails for boots and shoes, is to obviate the damage which ordinary nails cause by coming out of the soles, and in other cases, such as for marine purposes, the cast nails and articles may receive a coating of zinc, lead, or copper.

[Printed, 10*d*. Drawings.]

A.D. 1862, May 10.—N° 1403. (* *)

CLARK, WILLIAM.—(*A communication from Jean Louis Abeilhou.*) —"The application of a vegetable fibre, alone or in combination " with other matters, in the manufacture of felted and other " fabrics, also a substitute for flock or powdered wool, and as " a material for padding or stuffing, and for other useful " purposes."

This invention consists in the employment for various purposes of the down which surrounds the seeds of the aquatic plants technically termed "typha," and commonly known as reeds or bulrushes. The down is gathered when the seed has arrived at maturity, and dried, after which it is placed on wire gratings similar to those employed by wool beaters, and beaten with rods so as to separate any seeds which may have been gathered with the down, such seeds falling through the grating, the down being then operated on by an arçon (which is an instrument used in hat making), "until it possesses the fineness of silk " and has a silvery appearance." "In these two operations a " beater may be substituted for the gratings," and the arçon " be replaced by a blower or card, which apparatus are well " known; or the same result may be obtained by using chemical " products."

The down thus prepared may be mixed with silk, cotton, wool, flax, or other fibrous materials, and such mixtures spun into yarns for the manufacture of textile fabrics. It may also be used "for " all kinds of carded substances," and in a felted state (in which state it may be combined with the fur of the rabbit, hare, or beaver) as a substitute for leather, while the "detritus" will serve " for the rollers and small cylinders used for conducting the " threads in spinning silk, wool, cotton, or flax," as well as other purposes.

Many other uses to which this down, either alone or in combination with other materials, may be applied are mentioned, including the manufacture of washers.

The patentee states that this down is "the only vegetable sub-

" stance suitable for conversion into a felt," and that the advantages attending the use of such down will be " incalculable."

[Printed, 4*d*. No Drawings.]

A.D. 1862, May 13.—N° 1447.

SOUTHWOOD, William.—This is an invention of machinery adapted for making cut nails from bars of iron or other metal, in a heated or cold state. Two machines are described, the first for making cut nails, and the second for making cut brads or shoe bills.

The metal bar of the necessary form and size, when presented by the workman, is seized by a holder and carried by the feeder into the machine, and held in position whilst a top cutter passing down between the holder and feeder cuts off the portion necessary to make two nails, at the same time dividing the nail piece by an oblique cut in the direction of its length, into two tapering parts, having the form of nail shanks, one part remaining on the bottom fixed cutter, the other part being deposited by the top cutter on an anvil below. In this position they are operated upon respectively by pairs of dies or plungers, which advance to give a finished shape to the shanks, and hold them whilst two heading punches advance simultaneously from opposite directions and form the heads. The dies and plungers then recede, the finished nail on the anvil is removed by a reliever, and that on the bottom cutter by the next advance of the feeder. Slit rods in a heated state are preferred.

The brad or shoe bill machine operates upon thin narrow strips or plates, the width of the strip determining the length of the brads, which are cut transversely from the end of the strip, alternately at different angles, the head of each brad in succession being cut from the opposite edges of the strip by a reciprocating bottom cutter, acting by turns with two fixed cutters, the metal strip descending perpendicularly between them is fed by its own gravity.

[Printed, 1*s*. Drawings.]

A.D. 1862, May 28.—N° 1609. (* *).

RANSOME, James Allen.—" Improvements in the manufac-" ture of and in fastening railway chairs with wood trenails."

"For these purposes wood trenails are made, and are com-
" pressed, and are allowed to cool or set in moulds or dies in
" which they are compressed as heretofore; they are then drilled
" longitudinally from the head towards the point, but the lower
" part or point is left solid in order to admit of its being driven
" into a sleeper without injury. It is preferred that the hole thus
" drilled into a wood trenail should be cylindrical in order to its
" receiving a cylindrical metal spike, which should, as nearly as
" may be, fit the interior of the hole closely without requiring any
" considerable force to drive it in, it being desirable that the
" spike should derive its principal holding by the expansion of
" the trenail after it has been driven. It is desirable that the
" wood trenails made with solid points or lower ends as above
" described should be driven by the aid of a tool with a hollow
" face (corresponding with the curvature of the upper surface of
" the head of the trenail) which is placed on the top of the trenail
" when it is being driven. This tool is made with a projection
" on its under side which fits the upper part of the hole in the
" trenail. In using these trenails to fasten railway chairs to
" sleepers, the trenails are driven in through the holes in the base
" of each chair into the sleepers; the spikes are then introduced
" into the holes formed in the trenails, so that when the trenails
" expand in use the spikes will be more and more securely held,
" and the chairs will be better fastened to the sleepers than when
" using metal spikes alone, or wood trenails alone."

[Printed, 6*d*. Drawing.]

A.D. 1862, June 4.—N° 1677. (* *)

PERRY, ARCHIBALD HEWISON.—"Improvements in fastenings
" for and in the method of fastening together or securing railway
" chairs and sleepers, and for other similar purposes."

The patentee says, "I take a wooden trenail, either turned
" parallel with a head or shoulder, or with any suitable amount of
" taper, and I bore a hole along its axis; I also take an iron spike
" or round metal pin with a head, and flatten it at some distance
" above the point; but I prefer to leave the point cylindrical, so
" that there is a square shoulder formed on two sides by the
" flattening. For the purpose of fastening iron chairs upon
" wooden sleepers, I first bore the sleeper or other substance and
" then drive the hollow wooden trenail through the hole in the

" chair and into the wooden sleeper to the required extent; I " then drive the novel description of spike or pin into the hollow " trenail, which is thereby expanded at its lower end, and thus " forms a dovetail within the wood, which will prevent the trenail " from being withdrawn from the sleeper, as also the spike or pin " from being withdrawn out of the trenail." The iron spike should " be driven through the trenail so that the shoulders above " the cylindrical point may project below the end of the trenail."

[Printed, 8*d*. Drawing.]

A.D. 1862, June 4.—N° 1680.

JAMES, WILLIAM.—This invention relates to an apparatus for forging twisted nails, bolts, and spikes applicable for railway and other purposes, out of rod iron especially prepared in the rolling process, the rolls employed having annular projections combined with the ordinary hemispherical grooves, for the purpose of forming longitudinally one or more indents or grooves along the rod, which as it passes from between the rollers, enters and is forced through a twisting die. This die has the same transverse sectional form internally as the rod has externally, and is of sufficient size for the rod to pass easily through it, the groove or grooves in the rod being filled by one or more corresponding ribs or threads with which the die is internally furnished; these ribs incline spirally, and as the rod is forced through the die, it is twisted by them to the same degree of spiral inclination. The rods thus prepared are afterwards to be made into bolts, nails, etc. the cutting up, heading, and finishing being effected in the usual manner by ordinary machines. Whilst such a bolt or nail is being driven it turns in the hole made to receive it, and it is stated, is capable of more tenaciously holding its position against attempts to withdraw it or other loosening causes, than ordinary bolts or nails.

[Printed, 6*d*. Drawing.]

A.D. 1862, June 5.—N° 1694. (* *)

BELL, JAMES.—" Improvements in fastenings for railway " chairs."

This invention relates to an improved metallic spike, to be substituted for the trenail or fastening by which railway chairs are ordinarly secured upon their sleepers.

According to one modification, it "is made of a piece of sheet " iron, which is bent or shaped in dies or moulds into a tubular " form, with a conical enlargement, forming the head. The edges " of the metal are not brought quite close together, but are left " slightly apart, so that the spike may be slightly compressed on " being driven home, and its consequent tendency to re-expand " will give it a firmer hold in the sleeper."

"According to another modification, the edges of the sheet " metal may be made to slightly overlap each other; or, again, " the spike may be made out of a tube, one end whereof is ex- " panded, to form the head, being slit a short distance to admit of " the widening, if necessary. The spike may be made of various " proportions, and of metal of various thicknesses; but in ordi- " nary cases the diameter of the shank will be about one inch " and an eighth, and the thickness of the metal about three- " sixteenth of an inch."

[Printed, 8*d*. Drawing.]

A.D. 1862, June 19.—N° 1810. (* *)

WIGZELL, MONTAGUE.—" Improvements in the form of bolts " and other fastenings for ship-building and other purposes." This invention relates "to the form of bolts and other fastenings " to be used in ship building and other purposes to which it may " be applicable. It consists of a circular formed bolt, nail, spike, " or pin, having one or more worms, ribs, or projections, of such " a form and so placed in a spiral direction around its surface, " as to cause the bolt, nail, spike, or pin, to revolve whilst being " driven into the timber after a hole has been made the size of " its solid or hollow circular centre, and driven home by a " direct blow from a hammer, and will hold into the timber " or other substance into which it may be driven with greater " tenacity than the plain circular bolts now in use."

[Printed, 8*d*. Drawing.]

A.D. 1862, July 10.—N° 1990.

TOWNSEND, ELMER—(*A communication from Joseph Foster Sargent.*)—This invention relates to a machine adapted for cutting shoe nails or tacks from metal strips, and driving them in succession into the soles of boots and shoes, for the purpose of fixing the soles to the upper leathers. The mechanism is supported upon a pillar standard, and rotary motion is given to the main shaft by the foot of the workman by means of a treadle. The nail strip is presented to the cutters by a pair of feeding rollers, and the tacks are cut transversely from its end by a vibrating cutting apparatus; the piece or tack cut off is then brought into position to be driven into the boot or shoe sole, which is held by a last that is suitably mounted on the top of a vertical lever; this lever is forced up, so as to keep the last in position beneath the tack driver, by a counterbalance weight, the last being capable also of moving in any lateral direction. The header is a vertical rod, which is suddenly brought down by a spring, its lower end striking directly upon the tack, drives it into the sole, at the same time that an awl fixed in the header carrier, punctures a hole in the sole to receive the next tack. The metal plates, of sufficient breadth to make nail strips, are prepared by suitable rollers, which leave thick edges gradually diminishing to the centre line, where the plate is very thin. Along this line the plate is slit to make two strips, so that each half tapers in cross section to a thin edge, and when the tacks require to have heads, the thick edges of the plate, have by the rolling process, a shallow rib raised on both sides.

[Printed, 10*d*. Drawing.]

A.D. 1862, July 12.—N° 2014.

COCHRANE, William Erskine.—This invention relates to railway fastenings, and to the fixing of bolt nuts, so as to prevent their unscrewing. It refers chiefly to the construction and mode of fixing fish plates, having on the inside short studs or projections for entering holes in the ends of the rails they conjoin, and on the outside two projecting lugs, which respectively abut against the ends of the chair jaw; the outside of the plate has also a number of transverse grooves forming a series of ribs. The plates are fastened in the chairs by means of iron wedges, and these wedges are on the inside surface grooved transversely in the same way as the plates, but not at distances corresponding therewith, so that when the wedge is driven in between the chair jaw and the fish plate, one or other of the grooves in the rail and in the plate come into coincidence, and a key way is thereby formed to receive a small iron wedge or key which when driven down, locks the plate, the wedge, and the chair together.

When the fish plates and wedges are made of cast iron, they may be strengthened by pieces of wrought iron wire rod or bar, so laid in the mould, that they become imbedded in the cast metal with which they are completely surrounded, and the unscrewing or loosening of bolt nuts is prevented by the use of intermediate plates; these plates are made to suit hexagonal, square, or other form of bolt head or nut, having notches or openings which embrace or abut against the angular corners of the nut. One plate may be made of length sufficient to include three or four nuts, if the latter are not too wide apart.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1862, July 31.—Nº 2171.

WEILD, William.—This invention, relating to "machines for "cutting, shaping, rolling, screwing, milling, and fluting metals," consists of:—

1st. A machine designed for manufacturing fire-box stay bolts, adapted for locomotive and other boilers and purposes. In this machine are combined the processes of cutting, shaping, drilling, and rolling. The copper or other metal bolt rod is introduced horizontally between a pair of shaping dies; the lower die is fixed to the frame, and the other or upper die is attached to the lower end of a vertical slide, which obtains motion from a cam shaft above. Fitted to work against the face of this slide there is another slide, which at its lower end carries a cutter, and also has vertical action from a cam above. The dies square the end of the rod which, having been pushed forward to a stop gauge, is cut off by the descent of the cutter, which co-operates with the front edge of the fixed die. The bolt piece then falls between three horizontal rollers which reduce it by compression to the desired size, one, the pressure roller, being carried by a rocking lever, which is operated by an eccentric; when sufficiently drawn out the bolt piece falls between the rollers into a receptacle beneath.

2nd. Relates to an apparatus designed for screw threading stay bolts, which apparatus operates by means of three vertical steel rollers or roller dies mounted in trigonal position and revolved simultaneously at a uniform speed by tooth wheels. Each of these rollers is screw threaded on its surface, and slightly tapers upwards. The bolt pieces are inserted at the top into the triangular opening formed by the three rollers, and whilst passing *down* endwise between them, are impressed by the screw threads on the rollers which raise corresponding screw threads on the bolts. One of the die rollers is capable of adjustment to suit bolts of different diameters.

3rd. Relates to an apparatus for drilling metals, which consists of a long bed, whereon are mounted three ordinary drilling apparatus which act independently, and are capable of both longitudinal and lateral adjustment to suit the position of the objects to be drilled, which are fixed on a long table in front.

4th. Relates to apparatus adapted for milling the surface of the rollers employed in spinning, and as self-acting temples and taking up rollers in the process of weaving. The apparatus employed is similar to a slide lathe, and is a modification of a former invention, for which letters patent dated September 20, 1859, No. 2139, were granted to this inventor.

5th. Apparatus for fluting the rollers employed in preparing and spinning cotton, and other fibrous substances.

[Printed, 3*s*. Drawings.]

A.D. 1862, August 1.—Nº 2184.

MARSH, John Edwin.—The object of this invention, which relates to machinery for making rivets or rivetting tacks to be used for uniting the soles and upper leathers of boots and shoes, and for similar purposes, is so to improve the form of the points of such rivetting tacks, that when driven home they shall turn and clench without breaking. To this end the points of such rivetting tacks are made with two flat sides in the form a chisel point, or as nearly approaching that shape as possible, thereby giving the point strength to allow of its being clinched. This result is effected by modifying the shape of the cutting tools employed in the cutting machine, which cutters "require to be sunk " to the form necessary to produce the flat point."

[Printed, 4*d*. No Drawings.]

A.D. 1862, August 15.—Nº 2299.

BARCLAY, James.—This invention relates to machinery for making nails from wire, and to other mechanism for cutting nails from sheet metal.

In the machine for making wire nails four levers are employed " two working horizontally and two vertically; the end of each " pair of levers operate so as to squeeze the wire to a point, and

" are operated upon by slides and rollers. The heading operation " is performed by a sliding heading tool; a revolving plate fitted " with spring sliding holders takes the pieces of wire from the " heading tool, and carries them successively opposite to the " pointing tool. Expanding dies operated upon by a screw for " opening and closing the same, are employed to hold the wire " whilst it is advanced and cut off to the desired length to form a " nail."

In the machine for making cut nails, it is proposed also to employ "a circular piece of metal or table suitably held, and " capable of being moved about its axis of motion, so that, supposing a strip of sheet metal of the width of the required length " of the nails to be made therefrom to be placed on said table, " and said table to be moved about its axis of motion by suitably " self-acting mechanism, the said strip instead of being presented " square to the cutters is inclined thereto sideways, and then cut; " the strip is afterwards moved in an opposite direction, and " again cut, the effect of which is to cut strips of a wedge form " instead of with parallel sides, or, in other words to cut the " strips pointed. The heading operation is effected by a bent " lever operated upon by a cam, each nail being held by expanding dies operated upon by sliding pieces of metal formed with " inclined or wedge-shaped ends. Each strip of metal cut off the " main strip falls upon a vibrating piece of metal formed with " two sides, which throws the cut pieces alternately down two " channels formed in a casting; thence they pass between the " pressure rollers . . . . where they get consolidated, and, " finally, are taken hold of by the expanding dies, and held thereby " during the heading operation.

"The above machinery is designed to be double-acting, that is " to say, whilst one nail is being headed on one side of the " machine the other side of the machine is discharging a finished " nail."

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1862, August 20.—N° 2327.

WHITTLE, William.—This invention relates to "machinery " for manufacturing nails and spikes from ordinary nail rods. For " this purpose, to form blanks the rods are passed into a machine " *in a cold state*, and a portion of the said rod of a sufficient

" length to form a nail or spike is cut off. It is then held firmly " between a pair of dies, one of which is stationary and the other " moveable, whilst the heading tool advances and forms the " head. The moveable die then recedes and allows the nail or " spike blank to fall from the machine. The blanks thus formed " have no points, that is to say, they are of the same size, excepting the heads, as the rods from which they are cut. The same " process may be performed while the rod is in a heated state, " but I prefer using the rods in a cold state. The blanks thus " formed are then inserted at the ends intended to be pointed " into a suitably arranged furnace containing fuel in an ignited " state, and urged to a white heat either by mechanical means or " by the draught produced by a chimney stack. The blanks are " then withdrawn by the workman, and while in a highly heated " state are inserted between the dies of a forging or pointing " machine, the said dies being formed to suit the taper of the " points to be given to the nails or spikes. There are four dies " or tools in this machine, which may be arranged to work in " pairs in planes at right angles to each other, that is to say, two " of them may be made to advance in opposite directions in a " vertical plane while the other two are receding in a horizontal " plane, thus alternately beating or compressing the nail or spike " on the two opposite sides; or there may be two moveable and " two stationary dies used for the same purpose."

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1862, October 7.—Nº 2703.

HEAP, JOSHUA.—This invention relates to screw stocks and dies, and "consists in making screw stocks of one piece, having " dies, one or both furnished with a tail screw, on which is a nut " fitting in a concave recess in the screw stock."

"The dies are portions of cylinders or of other suitable shape, " and have V grooves fitting on similar projections in the screw " stock, which is made in the form of a fish belly at the centre to " combine strength with lightness and to reduce labour in constructing. The centre portion of the slot in the screw stock " is enlarged to allow the dies to be put in their places and " removed."

"The dies may be made of cylindrical pieces of steel, which are " screwed into the screw stock. Each die may be provided with

" three cutting recesses for screwing bolts or other articles of " different diameters."

[Printed, 8*d*. Drawing.]

A.D. 1862, October 10.—Nº 2733. (* *)

GREEN, ROBERT ELLIS, and COCKCROFT, JOHN.—"An " improved amalgamation of materials forming a substance suitable " for printers' blankets, conductors used in paper-making, " packings for joints and similar purposes."

The application of a solution of india-rubber or its substitute to paper alone, or in combination with fabrics as follows; two or more lengths of paper are combined by means of "a " solution of india-rubber or its substitutes by spreading it " between them and pressing them together." Or "a textile " fabric such as linen, cotton, or woollen," is put on the outside with paper underneath, always making the different folds adhere with a solution of india-rubber or its substitutes. "For printers' " blankets it must be adapted to the peculiar colors used by the " printer, as some colors are strongly acid, some alkaline, and " others neutral." For paper makers' webs, in preference, using " folds of woollen paper with a textile fabric at the back." For washers for steam joints joining "any suitable number of any of " the above materials together" and submitting "them to pressure " and heat or other drying process."

[Printed, 4*d*. No Drawings.]

A.D. 1862, October 13.—Nº 2753.

HASELTINE, GEORGE.—(*A communication from Lyman Derby.*) —This invention relates to "jacks and screw nuts" for attaching the thills and poles to the axletrees of wagons and other vehicles. For this purpose, upon the axletree at its midlength, is fitted and properly secured by a cap plate and bolts, a clip or jack, in the front side of which is fixed a vertical bolt; the top or head of this bolt constitutes the central part of a hinge, the two sides being formed on the end of the thill iron, so that the bolt and the thill iron, which receives the end of the pole, are united by a working joint. A "compound screw nut" in two parts having their contiguous faces fashioned like an ordinary clutch, is employed to secure the vertical bolt, and so prevent the jarring and rattling noise consequent upon the wear caused by the constant motion of the parts.

[Printed, 6*d*. Drawing.]

A.D. 1862, October 14.—N° 2762.

GRICE, Frederic Groom.—The object of this invention is to improve the manufacture of nuts for screw-bolts, and the mode of working the machinery employed. The nut iron in the process of manufacture is reduced to the required shape by appropriately formed rollers, and as it passes from the rolling machine, it is by means of a circular saw or shears cut into short lengths which, by the aid of a pair of tongs, are in quick succession seized by the workman, and fed into a nut-making machine of ordinary construction, but arranged to work at an accelerated speed, so that it shall keep pace with the production of the rolling machine, in order that the iron may be converted into nut blanks before it has time to cool, the first heating of the metal for the rolling process being sufficient. By this means the deterioration of the metal consequent on re-heating for the purpose of working it up in the ordinary way, is avoided, and the nuts are produced of a uniform thickness. The bars of nut iron prepared in the rolling process for making hexagonal nuts, are so indented on the edges by rollers having a series of longitudinal angular grooves that four sides of the nuts are shaped thereby, and the other two sides are developed as the nuts in succession are separated or cut from the bars.

[Printed, 8*d*. Drawing.]

A.D. 1862, October 17.—N° 2804.

WICKENS, Henry.—(*Partly a communication from William Wickersham.*)—This invention relates to the constructional arrangement of machines adapted for cutting nails from wide sheets of iron or other suitable metal, without requiring such sheets to be previously cut into strips. The metal sheets are held and fed at suitable intervals into the machine by a pair of feeding rollers, appropriately mounted on a slide fitted to move crosswise in front of the cutters, which are carried radially projecting at opposite sides from the periphery of a cylinder, and as they in rotation come round therewith, they act by turns in co-operation with companion cutters rigidly fixed to the machine bed. The nails cut off taper from beneath the head to the point, which is cut diagonal, two small triangular pieces being left by the cutters to form the lateral projections of the heads of the adjacent nails. The feeding roller slide traverses the length of two nails every revolution of the cylinder and cutters, the feed rollers actuated by means of a ratchet advance the nail plate, and the cutters are disposed to operate at a suitable inclination for giving the tapering form to the nails.

Two modifications of the above machine are also described and illustrated, one dispenses with the rotating cylinder and shows the cutters attached to the end of a lever, and in the other the mechanical arrangements for driving the cutters are changed.

For making horse-shoe nails, the plates should have longitudinal ridges raised along the edges to form the heads of the nails, for which purpose the rollers employed must be appropriately grooved.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1862, October 21.—N° 2838.

HASELTINE, George.—(*A communication from William Avery Sweet and John Edson Sweet.*)—This invention relates to machinery for cutting nails and brads, and similar articles.

The nail blanks are cut transversely from the end of narrow metal plates or strips in width corresponding with the required length of the nails, by a tempered steel punch and die, instead of by shears or cutters. The face of the punch, which is to be operated in any convenient manner, is shaped externally to the tapering form of the nail, and the die having internally a similar configuration, is formed by two bars or parts of steel, adjustable lengthwise by means of screws or other suitable device, and capable when worn of being removed and sharpened. These bars are, for the convenience of making the machine self-feeding, placed horizontally, the nail plates or strips gravitating down a vertical or inclined guide way, each move the width of two blanks, in the direction of the punch and die, which cut from its end two nails at one operation, one nail being cut from the extreme end of the strip whilst the second is forced through the die by the punch, the heads of the two blanks respectively being formed from the opposite sides of the strip. These two blanks, their heads laying in opposite directions, then pass to the heading apparatus, and are held by two pairs of grippers, which respectively grasp the entire length of the nail during the heading operation. The headers or hammers of which there are two, one operating at each side of the machine, turn on adjustable centres; they may be arranged in any convenient way, and modified in form to adapt them to any required shape of head.

[Printed, 1*s*. Drawings.]

A.D. 1862, October 24.—N° 2869.

STROUD, John Thomas.—(*Provisional protection not allowed.*)—This invention relates to divers machines and appliances for holding, drilling, turning, tapping, fitting, shaping, and finishing certain parts of steam, water, gas, and lamp fittings.

1st. Machine for turning, drilling, and tapping, the inside and outside of unions, cocks, and similar articles. The holding dies are mounted in a disc or chuck, and made to advance and retire by cams brought into action by an eccentric whilst the machine operates, and the cutting tool has a self-acting backward and forward motion on a sliding bed. This machine may be adapted for drilling.

2nd. Describes an arrangement for a duplex machine designed for operating with four separate tools, two for turning and drilling, and the others respectively for tapping the inside and cutting threads simultaneously outside articles, which are held during the operation between the closed jaws of a chuck.

3rd. Self-acting machine for clearing out and afterwards tapping the hollow parts of caps, covers, and such like articles, and capable also of cutting external screw threads. The work during the operation is held between the jaws of a chuck, capable of expanding and so closing upon the article and fixing it in a central position, that the drill and tap may operate in succession without any further adjustment.

4th. Machine for drilling, tapping, and turning, the drill and tap respectively being worked at different speeds on separate spindles, by independent motion derived from lateral cams on a back shaft; the work is held between adjustable jaws, and shifted by a cam from a position directly opposite the drill, to a similar position opposite the tap.

5th. Machine with a reciprocating revolving spindle adapted for receiving drills or taps at either end, the articles to be drilled or tapped being fixed on suitable carriers, and advanced to the drills or taps directly in a line with the spindle axis. This machine with modifications is capable of cutting off, preparing, and screwing the ends of tubes.

6th. Apparatus for centering and drilling articles of various kinds, and subsequently to be operated upon by other machines.

7th. Upright drilling machine described amongst other things as applicable for drilling the holes in plugs, and rimmering the holes in cocks, the articles operated upon being held by jaws operated by the workman's foot by means of a treadle.

8th. Apparatus for holding articles of gas fitting whilst squares or flat surfaces, such as are required on the end of a swing plug or the sides of a screw head are formed by the operation of a suitable cutter, fixed in the revolving spindle of an ordinary lathe.

9th. Apparatus or chuck for holding articles of an irregular shape, such as connecting cocks, bracket backs, and similar things, during the process of turning.

10th. Machine for turning articles externally, the cutting tools being advanced to operate by self-acting means.

11th. The apparatus for shaping the periphery of the pulley wheels employed for sustaining the balance weight of chandeliers, and for other purposes.

12th. Apparatus employed for turning, cleaning off, milling, and finishing, unions and other articles, combining a duplex rest adapted for holding the operating tools, and brought into action by the foot or hand of the attendant.

Lastly. Apparatus for brightening and cleaning the surfaces of gas fittings.

[Printed, 6*d*. No Drawings.]

A.D. 1862, October 28.—N° 2899.

FLETCHER, JOHN, senior, and FLETCHER, JOHN, junior.—(*Provisional protection only.*)—This invention relates to machines adapted for shaping the spokes of iron wheels, bolts and articles of varying diameter. The metal bar employed for making bolts may be of uniform size, corresponding to the required size of the bolt head, either round, square, or polygonal. The shanks are reduced to the desired size by passing the rod whilst in a heated state, to and fro between grooved rollers, which are mounted between side frames or housings, and caused to reciprocate on their axes, the length of partial revolution in either direction being capable of adjustment; and in order to roll the shanks of bolts close up to the head, a portion of the surface of each roller is cut away, so as to form when the two parts come together a recess or sudden enlargement in the grooves, the length of motion and speed of the two rollers coinciding.

Spokes for iron wheels are rolled between rollers, the grooves in which vary in breadth and depth in proportion to the desired form or varying diameter of the spoke, proper provision being made for regulating by means of screws the proximity of the two rollers, and their reciprocating action by the radial position of an adjustable crank pin.

[Printed, 4*d*. No Drawings.]

A.D. 1862, November 12.—Nº 3043.

GALLOWAY, WILLIAM, and GALLOWAY, JOHN.—This invention, relating to machinery for cutting, shaping, punching, and compressing metals, is supplementary to prior letters patent granted to James Howden, bearing date February 28, 1859, Nº 526, and consists of various constructional alterations and additions to a machine therein described as adapted for making bolts, rivets, and similar articles. This machine performs by means of two horizontal intermittently revolving die tables or holders, which respectively carry a circumposed series of dies for co-operating with two vertical acting heading rams.

According to the present invention two preparatory rams are added, for the purpose of forcing the pieces of metal severally into the dies in succession, so as to bring them into true vertical position previous to the operation of the heading rams. The dies of the preparatory rams are so formed as to readily adjust the piece of metal if in a slanting position, and in some cases they partially form the head.

Making cold water channels in the die tables or holders for the purpose of keeping the dies cool.

Placing steel plates upon the die tables, respectively to protect them from the pressure of the dies.

Fixing the dies in the tables by means of plates, which are bolted down to the tables, and severally occupy the intermediate spaces between the dies.

Instead of moving the die tables intermittently by means of ratchets fixed on their vertical axes, the pawls act upon suds projecting from their circumferential periphery, and in order to prevent the tables when in motion moving too far, friction pieces are caused to press against their sides, or spring pieces are arranged to lock between the studs.

Instead of actuating the cutters by means of eccentrics on the driving shaft, the work is performed by cams and tappets which are mounted on the crank shaft.

[Printed, 1*s*. Drawing.]

A.D. 1862, December 6.—Nº 3281.

PALLISER, William.—This invention relates to the manufacture of screw bolts, designed for fastening armour plates to vessels and applicable to other purposes, the object being to transfer the weakest part of such a bolt from the screwed end where it usually breaks at the first thread, and distribute it along the shank, which is thereby made more capable of slightly yielding to any sudden longitudinal strain or dynamical concussion.

To this end a portion of the shank of the bolt is reduced in diameter from a point more or less near the head, to a point more or less near the threaded end, and the diametral measurement of the part so reduced, corresponds with the depth of the thread, or the solid part of the bolt at the screwed end. If it is necessary that the bolt fill the bolt hole, the uniform diameter of the bolt shank is restored by casting zinc round the part reduced. The threads of these bolts are rounded and not so deeply cut.

Instead of reducing the shank of the bolt an analogous result may be obtained by making the shank of wrought iron and the screwed end of shear or other weldable steel. The shanks of these bolts are drawn down by rolling or otherwise, so as to leave the heads the original diametral size of the rod, in order that the longitudinal grain of the iron may not be disturbed.

[Printed, 8*d*. Drawing.]

A.D. 1862, December 30.—Nº 3475.

BOWSER, William, and BOWSER, Howard.—This invention relates to the coating, with a view to their protection and preservation, of steel or iron plates, bolts, rivets, and other articles, with copper, or metallic alloys containing copper. To this end a reverberatory furnace is constructed and combined with and having an opening into a contiguous oven or coating chamber, and so fitted that the articles under process, having their external surface clean from oxide or other matter, are made to pass slowly through the furnace, whence being heated to a white heat they are moved forward into the coating chamber, where they are brought into contact with the copper or alloy, which is introduced in the form of thin sheets, strips, or granulated. The heat of the plates or articles melts the copper or alloy, which spreads itself over their surfaces, and to which it becomes so intimately and thoroughly attached, that, it is stated, when the process is performed in a careful and skilful manner the combination of the metals is so complete, that subsequent reheating, hammering, drawing, or rolling, will not disjoin or detatch it.

The process of coating small articles such as bolts, rivets, nuts etc. requires modifying. In these and analogous cases, the copper or alloy is, in a melted state, caused to flow over the articles, which are to be previously heated to a white heat in the furnace, the greatest care being taken that, during the coating operation, the articles under process are confined in a coating chamber from which all atmospheric currents are excluded.

[Printed, 8*d*. Drawing.]

1863.

A.D. 1863, January 13.—N° 103.

TANNAHILL, DAVID, and TANNAHILL, JOHN.—This invention relates to that description of rivet making machinery employing intermittently revolving die tables or holders carrying a circumposed series of dies, which severally by turns at each succeeding movement of the die table, co-operate in succession with a heading ram or die. The object of the present invention is,—

1st. To devise effective and simple means for accurately moving the die table. For this purpose a catch, centered on a fixed stud, is arranged to engage with a reversed ratchet wheel, which is combined with an ordinary ratchet and pawl, the catch being pressed into the reversed ratchet by a spring, and momentarily shifted at the commencement of each successive move of the die table, the teeth of the ratchet wheels being cut out of steel. When the die table is disposed horizontally it rests and turns in an annular V-shaped groove.

2nd. Relates to machines wherein the heading ram works horizontally. A keeper receives the blanks in succession as they are cut off the rods, and holds them in true position opposite a die for the operation of the heading ram. When the ram strikes the blank the keeper relaxes and is withdrawn. The ram is adjustable in position, and has a contrivance for pushing the blank into the die previous to the final compression, and the movable cutter, instead of being fixed to a lever, is made to work rectilineally in guides. The bearings of the main and first motion shaft are movable, and the concussion of the shaping stroke is received by an adjustable wooden spring beam.

[Printed, 10*d*. Drawing.]

A.D. 1863, January 13.—N° 108.

SOUTHWOOD, WILLIAM.—(*Provisional protection only.*)—This invention, relating to the manufacture of cut brads, is supplementary to a prior invention for which Letters Patent, bearing date May 13, 1862, No. 1147, were granted this inventor. "The
" object of the present invention is, that for the purpose of partly
" or completely forming that class of nails termed brads, I em-
" ploy a cutter or cutters of peculiar form, which will either cut,
" or cut, stamp, or press two brads at one time from slit bars or
" other forms of metal. The form of this cutter is varied as may
" be required, but its general features consist in forming a rebate
" upon the cutting edge, by which means both nails are cut by
" the under side of the cutter, one nail being stamped also by
" the under side of the cutter, whilst the second is stamped by
" the under side of the rebate. I can use with these cutters all
" or only a portion of the mechanism described in the specifica-
" tion of my former patent."

[Printed, 4*d*. No Drawings.]

A.D. 1863, January 14.—N° 116.

PIDDING, WILLIAM.—(*Provisional protection only.*)—This invention relates to the use, in the manufacture of boots and shoes of nails, studs, and toe and other plates, made from a variety of metallic and other mineral, vegetable, animal, or manufactured substance or compound, amongst which may be mentioned metal, stone, wood, porcelain, leather, horn, shell, pith and resinous gum, combined sometimes with metal as a covering or as an internal support. Rings or washers of caoutchouc are placed *under the heads* of shoe nails and toe plates or pieces, to give them elasticity when passing over rough ground, and plates or layers of some of the above materials are hidden in the soles. The other portions of this provisional specification relate more particularly to the construction of the inner soles of boots and shoes, from elastic or other substances perforated for the purposes of ventilation or otherwise, and to the outer soles, which are made from various substances, and perforated to receive the nails and studs, whereby they are fastened to the inner soles.

[Printed, *4d.* No Drawings.]

A.D. 1863, February 2.—Nº 292.

GRICE, Frederic Groom.—This is an invention of machinery adapted to the manufacture of bolts, spikes, rivets, and screw-blanks, and consists in so combining the operations of rolling bolt iron with the machine employed for forging and shaping such bolts, that the subsequent operation is performed before the iron has time to cool after the rolling process, once heating of the metal for both processes being sufficient. The form given to the bar by the rollers, which are correspondingly grooved, raises one or more longitudinal ridges, giving it in transverse section a kind of pear or diamond shape with the angles rounded off and suitable for dog-headed spikes or bolts. These rods are received from the rollers, and in succession fed intermittently into the machine, either by rollers or other appropriate contrivance, through a hole in a steel cutter, the extreme end of the rod passing between a pair of dies, one of which in closing with the other by a sliding movement against the face of the cutter, cuts the piece of metal held between them from the rod. These dies are shaped internally to impart the required form to the shank of the nail, and the heading process is performed by a die mounted on a slide, which obtains motion from a crank. According to the desired style or shape of head, so also must the heading die be internally formed, and when bolts with square necks are required, the dies must be correspondingly shaped. The bolts which are forced from the dies by a rod are then placed to slide down an inclining slit rail, and thence in succession they are taken by a pair of tongs and placed between a pair of holding jaws mounted on the end of the hollow spindle of a lathe, and there by means of suitable cutters the seams left by the dies are trimmed off, the heads are turned, and the points finished by a cutter on the end of a rod, which passes through the hollow spindle of the lathe, and by means of a cam is brought into cutting contact against the end of the bolt.

[Printed, 1*s.* 2*d.* Drawings.]

A.D. 1863, February 7.—N° 352.

REDRUP, George. — This invention relates to machinery adapted for cutting shives, corks, spiles, pegs, treenails, and other cylindrical or conical articles, and to the cutters employed. It is supplementary to prior Letters Patent bearing date June 24, 1859, No. 1520, and consists of an arrangement of cutters and a presser plate, respectively carried by two spindles, one working within the other, the presser plate being carried by the inner, and the cutters by the outer spindle, which is caused to rotate by a strap and pulley, and is capable by means of levers of receiving both vertical and horizontal movement, the wood or material resting during the cutting process in front of the cutter bed.

Describes a modification of the above machine, having in addition to the arrangement described a table placed at the back of the cutter bed, and contrivances for carrying the wood or material intended to be cut into spiles, vent or other pegs towards the advancing cutter or cutters.

A third machine, arranged on the principle of the turning lathe, is also described; in this machine the wood or material is held between two headstocks, one of which causes it to revolve.

A slide rest in front carries a series of tools and cutters, and these are by ordinary contrivances caused to advance and operate.

The drawings represent the forms of the cutters employed, and the mode of making them by a rolling process is described, the cutters generally having the reverse form of the spiles, treenails, and other articles required to be produced.

[Printed, 1*s.* 10*d.* Drawing.]

A.D. 1863, February 7.—N° 353. (* *)

GROUCUTT, David.—(*Provisional protection only.*)—" An im- " provement or improvements in the manufacture of iron for " making nails."

" A pile or faggot of good iron " is to be passed through bolting *or breaking down* rollers, and then, without being re-heated, is to be passed through grooved rollers driven at a high velocity. The iron being drawn out to considerable length, is then to be cut up into nails.

[Printed, 4*d*. No Drawings.]

A.D. 1863, February 14.—N° 404.

WOOD, William.—(*Provisional protection only.*)—This invention relates to a mode and apparatus for cutting external screws or threads; it is designed to render one die stock available for three or more dies, consisting,—

1st. "In the employment and use of two equilateral triangles or two four-sided pieces of metal, each side of which is to contain one-half of the screwing 'die,' so that when two corresponding sides are brought together, the 'die' will be formed at the middle or division when the two pieces come in contact, the triangular pieces being secured to a back plate by a central screw through each."

2nd. An "arrangement of apparatus for tightening and adjusting the 'dies' as now employed in ordinary 'stocks and dies,' and which is also applicable to the adjustment of the before-mentioned four-sided pieces. At the end of the opening in the stock wherein the 'dies' fit, a narrow slot is formed to receive a moveable nut, within which a screw works, terminating in a head which abuts against the back of the sliding 'die,' so that by turning the screw out of the nut, pressure is exerted on the 'die,' the nut and screw being readily displaced for the ready substitution of another die."

[Printed, 4*d*. No Drawings.]

A.D. 1863, March 5.—N° 615.

WHITTLE, William.—This invention, relating to machines adapted to the manufacture of nails, has for its object:—

1st. An improvement in such nail making machines as are employed to cut portions from slit or drawn metal rods, strips, or wires, and form heads on such pieces. The rods are fed into the machine intermittently by a pair of rollers, which are operated at the proper intervals by a ratchet wheel and pawl. The end of the rod is held by a pair of holding dies, which, co-operating with a fixed cutter, sever the length required for a blank from the rod, whilst a *header* carried by a slide is advanced by a cam, and by compression forms a head on the cut-off piece, which is previously moved into position opposite the header by the holding dies. The header then retires, and the dies return again to receive the end of the rod, which pushes from between them the previously finished blank.

2nd. Relates to pointing the blanks by a process of grinding. The grinders consist of two conical discs, having their circumferential surfaces cut with teeth in a manner resembling a steel file. The discs are respectively mounted on parallel axes, and revolve, one edge of each disc being nearly in contact with the corresponding edge of the other. The end of the blank is forced by the workman through a guide into the tapering space between the discs in the direction of their axes, and according as chisel or tapering points are required, so in conformity therewith must the position of the blank be changed. Modifications of the grinders are described and illustrated.

[Printed, 1*s*. 8*d*. Drawings.]

A.D. 1863, March 19.—N° 739. (* *)

CROCKER, Samuel Leonard.—"A new and useful or im-
" proved yellow metal sheathing nail or spike which by means of
" a nail-cutting engine is cut from yellow sheathing metal. The patentee says:—"The yellow metal above referred to is a com-
" position of about sixty parts of copper and forty parts of zinc.
" It is rolled into plates of sufficient thickness and shape to be
" cut up into nails. It is such a composition as is now exten-
" sively used in lieu of sheet copper for the sheathing of navi-
" gable vessels."

"I have discovered that by heating" this composition "to
" redness or thereabouts, and while so heated introducing it into
" the nail or spike machine, it may be safely cut up into nail
" blanks, and each of said blanks be headed by the machine.
" After the nails or spikes, as the case may be, have been thus
" made, they are to be again heated to or about to redness, and
" when so heated they are to be plunged into cold water; in con-
" sequence thereof their brittleness will be so overcome as to
" render them capable of being bent or driven without that
" danger of being broken under such operations as the common
" cast composition nails or spikes would be subject to.

[*Printed*, 4*d*. No Drawings.]

A.D. 1863, March 30.—N° 819.

HUGHES, HESKETH.—This invention, relating to machinery adapted for shaping polygonal-headed bolts, rivets, and other metal articles, and plastic substances, consists in employing for the purpose a set of two, three, or more rollers, cut or formed externally in a spiral direction from end to end, with the shape or pattern to be produced. The rollers move on their axes in the same direction and uniformity of speed, and are either slightly tapered, or set in a small degree deviating relatively from a parallel. The metal or material is guided in between the rollers at one end, and passing between guides in the direction of the length between their contiguous peripheries is discharged at the opposite end.

Rollers variously shaped with spiral configurations on their periphery are described and illustrated, comprising, amongst others, a pair of rollers for shaping polygonal-headed bolts, pins, rivets, and similar articles. Also a machine with rollers having spiral-fluted surfaces, adapted for making pills, confectionery, and articles from plastic substances, and a set of three rollers requiring no guides.

Thin tubes requiring ornamentation are first furnished with a leaden core, which is, after the process, melted out.

[Printed, 10*d*. Drawings.]

A.D. 1863, April 10.—N° 912.

GIMSON, JOSIAH.—(*Provisional protection only.*)—This invention relates to screw-cutting lathes, which operate upon the intended screw by means of two cutters alternately, one cutting in the usual way, whilst the lathe mandril is running in the forward direction, and the other when the ordinary motion of the lathe is reversed, so that no time is lost in bringing back the ordinary cutting tool when it has reached the end of its course, as the second tool is then brought into operation, the motion of the lathe and screw being reversed, the cutting thereby being rendered continuous. One tool is placed to operate in the usual way in front, and the other at the back, and relatively they are so connected that when either of them is brought into contact to operate, the other is caused to retire. Instead of the reverse cutting tool being placed at the back, it may be disposed in front with its cutting edge inverted; and in order that the tools may respectively come in and out of gear alternately at the proper time, the mechanism which regulates their movements is directly connected to act in conjunction with the reversing gear of the lathe.

[Printed, 4*d*. No Drawings.]

A.D. 1863, May 6.—N° 1133.

DAVIES, GEORGE.—(*A communication from Charles Alexander Louvrier*.)—This invention relates to two machines respectively designed, one for forging, and the other for dressing and finishing horse-shoe and other nails.

The forging machine operates by means of a recessed hammer-punch and four forging hammers, which act at right angles alternately in pairs respectively on vertical and horizontal planes, and the nail rod is presented between them in a line with and at right angles to the point of intersection, and advanced a limited distance at each successive blow of the hammers, several blows being required to draw out the shank of each nail. The rod is protruded a short distance beyond the hammers, so as to furnish sufficient metal for the head of a nail, and when both pairs of hammers have struck, the hammer punch advances, and by striking the end of the rod forms a head to the nail. The hammers then open, and the rod is advanced by degrees, the hammers opening and striking continuously until sufficient length of metal for the shank is drawn out, when the nail is cut off, and the end of the rod is again presented to the hammer-punch.

"The movements of the hammers and the feeding of the iron "rod are effected by means of cams suitably formed and keyed "on a shaft driven by toothed gearing from the main driving "shaft of the machine. The cutters for cutting off the nails as "they are formed are actuated by two eccentrics keyed upon the "same shaft. In this machine either one pair, or all four of "the tools or hammers, may have a rolling or oscillating move-"ment given to them by means of cams, as well as a striking "motion."

3rd. "The machine for dressing the nails and making the "points is constructed on the same principle as the machine for "forging, excepting that the tools or hammers open and close all "four at once. This machine is applicable to the dressing and

" finishing of nails, whether made by the preceding or any other
" machine, or forged by hand in the ordinary manner."

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1863, May 8.—N° 1155. (* *)

DROOP, Justus Charles.—(*Provisional protection only.*)—" An instrument or holder for holding nails, screws, or other " fastenings."

"This invention consists in magnetizing or applying magnetism " in connection with a tool called 'a tack or nail holder,' by which " means tacks, nails, screws, or other similar fastenings may be " picked up and held by magnetic attraction in the right position " for driving with a common hammer or screwdriver. The picking up part of this 'tack or nail holder' I prefer to construct " with a claw, and having a collar of india-rubber, gutta percha, " or other suitable non-conducting material to prevent the tacks " or nails, screws, or other fastenings adhering thereto otherwise " than to the exposed magnetized part of the 'nail holder' " which is presented to the tack, nail, or screw to be picked up. " The claw is also convenient for taking out tacks or nails when " required. The head or end of the 'nail holder' may be magnetized by any of the ordinary well known methods employed " for magnetizing or rendering articles magnetic."

[Printed, 4*d.* No Drawings.]

A.D. 1863, May 14.—N° 1211.

SATCHWELL, John, ASHFORD, William Henry, and HARRISON, Cornelius. — (*Provisional protection only.*) — This invention, relating to nails or rivets for boots and shoes and other purposes, is described as follows:—

"Our invention consists in making from a round piece of " wire a rivet with a raised head and threaded shank. Though " applicable for other purposes we design them as especially " useful in the manufacture of boots and shoes, the soles and " heels of which have hitherto been first united by means of " nails with a flat or countersunk head, and rivets have been " afterwards driven in. Now by our invention we construct " such a nail or rivet as above described as to combine the two, " so as to render one operation only needful where formerly two " were necessary. The nails or rivets may be made of any kind

" of wire, whether iron, brass, copper, zinc, or any other metal " or alloy of such metals, and may of course be manufactured of " any length and thickness required. The raised head is generally " made of a spherical form, but may also be constructed square, " oblong, or of any other desired shape."

[Printed, 4*d*. No Drawings.]

A.D. 1863, May 18.—Nº 1246.

TOY, Samuel.—(*Provisional protection only.*)—" This invention " refers to the machines employed in making the class of rivets, " nails, or pins used in joining the parts of boots, shoes, or other " leather articles, and for many other purposes, and it consists " in such improvements of the machines that I am enabled to " produce two or more of the rivets, nails, or pins at one revolution of the machine. I construct the frame and nearly all the " working parts of the machine precisely as they are now built, " but I employ two or more sets of cutters actuated simultaneously " by the same levers, using a corresponding number of set pins. " I also employ a corresponding number of dies for pressing the " nails, and all worked from one lever. The cutters and dies " are all fixed upon one plate of a suitable form to receive them. " I also employ two or more punches to head the rivets, nails, or " pins; these punches are fixed on a slide formed to suit the " different centres of the several dies and cutters; the heading, " when heads are required, and cutting off being performed at " one revolution of the machine."

[Printed, 4*d*. No Drawings.]

A.D. 1863, June 13.—Nº 1487.

BASS, Isaac Gray, and BASS, William.—The object of this invention, which relates to the making of nails and spikes, is so to fashion such articles in the process of manufacture that it is stated they may be driven into wood irrespective of the direction of the grain, no hole being made for their reception, without the risk of splitting the material. To this end the shanks of these nails or spikes are made by preference square, and all the four sides are concave or fluted throughout their whole length, so as to form at the angles four cutting edges. Two of these angles diagonally opposite run parallel from the shoulder beneath the head to the other extremity, which terminates in a flat point or end, but the other two opposite angles or corners, at a certain distance from the point, gradually become more obtuse, and meeting at the extreme end form respectively a sharp central projection at each side of the end of the nail, which terminates in a flat cutting edge. The sharp corners of the nail cut its way into the wood when driven and guide it in a direct course.

[Printed, 6*d*. Drawing.]

A.D. 1863, June 18.—N° 1531.

GOSSIAUX, Edward.—The object of this invention consists :—

1st. In making simultaneously in the same machine bolts, rivets, and spikes of any desired shape, length, or size.

2nd. Imparting to the anvil or die holder an automatic movement.

3rd. Employing a screw for regulating the speed of the die holding anvil.

4th. Adapting to the machine an apparatus for expelling the finished bolts and articles from the dies.

5th. Actuating the rotating die holding anvil by an intermittent rotary movement.

"In a suitable framing a sliding piece is mounted ; said piece " carries a die box and is put in motion by a lever worked by an " eccentric suitably fixed. The mechanism employed to expel " the bolts, rivets, or spikes from the machine consists of a " sliding piece of metal raised by a cam and fitted with a screw " for adjusting the length to which the expelling tool moves. " The tool in which the bolts, rivets, and spikes are made consists " of a piece of metal moving around an upright axis. This " table has six vertical holes made therein to receive the metal " from which the bolts, rivets, and spikes are to be made, and " there are four fixed standards carrying tools for forming the " heads of the aforesaid articles, so that as the table is moved " round by toothed gearing and the pieces of metal are placed in " each of the holes therein, when they come opposite to their " respective heading tools they stop whilst the heading operation " is being performed, and then the table moves on until the " next pieces of metal are brought under the heading tools, and " so on in succession, the articles being expelled by a self-acting " lever."

[Printed, 1*s*. 10*d*. Drawings.]

N.

A.D. 1863, June 19.—N° 1536.

BONNEVILLE, Henri Adrien.)—(*A communication from Jacques Victor Gauthier.*)—The object of this invention, which relates to machinery adapted to the manufacture of bolts and rivets, is to surmount the difficulties said to exist in such machines with regard to the introduction of the metal rod into the dies, its discharge therefrom when formed into rivets or bolts, and to prevent the rapid deterioration of those working parts which are brought into contact with the heated metal. The machine operates by means of an intermittently revolving disc or die holder carrying a circumposed series of dies or matrices, and having a corresponding series of radial slots or indents cut in its periphery. The requisite rotating step-by-step motion of the disc, is given by a projection on a circular plate, which at each revolution of the disc, enters severally by turns into the radial slots, and moves the disc round a portion of a revolution, equal to the distance between two of the dies, which by turns in succession at each move, are thus brought into position to receive first the end of the heated rod, which is cut off and carried at the next move of the disc opposite the heading tool, and finally opposite the rod which, in succession, pushes the finished rivets out of the dies. The heating furnace is so contiguously placed, that the metal rods pass through it as they enter the machine, and after each operation of the header, it is cooled by a stream of cold water which flows from a pipe thereon, and thence falls into a reservoir, wherein the lower half of the revolving die holder dips for the purpose of cooling the dies.

[Printed, 10*d*. Drawing.]

A.D. 1863, August 5.—N° 1929.

CLARK, George.—This invention relates to armour plating, constructing, and protecting ships and batteries, the preparation and nature of the materials employed, and lastly to bolts for fixing armour plates. It is divided into ten sections, viz.: "First, a "system of compound metallic and fibrous plate armour. "Second, a mode of strengthening ships to resist longitudinal "or transverse strain. Third, the construction of the battery of "armoured strips on a plan which relieves the sides and ends of "a ship of a great part of the weight of its top sides, armour, and "armament. Fourth, the formation of an inner line of armour

in a ship at, and above, and below the water line. Fifth, a plan
" of sheathing iron ships with copper. Sixth, ... mode of
" combining iron and wood in the construction of ships. Seventh,
" . . . the formation of iron cells as a backing to the armour of
" ships and forts. Eighth, ... method of constructing iron
" cells and fixing them as backing to ships' armour. Ninth, the
" conversion of iron bars and plates, manufactured for the con-
" struction of ships and forts, into steel."

Tenth. The bolts employed for fixing armour plates have conical heads, which are formed by turning or cutting away the metal, so as gradually to reduce the diameter from the end; the heads thus formed are from two to three inches long, and the reduced diameter of the metal is continued along a portion of the length or shank of the bolt, so as to form to the head a long neck, which is of uniform diameter. The two opposite sides of the head are then cut away in parallel lines with the neck. These bolts are not intended to pass through the armour plates which, instead of being perforated through entirely from front to back with bolt holes have only shallow conical recesses sunk into the back side, and in order to admit the bolt head, the two opposite sides of these recesses are cut away and made relatively parallel. The bolt head is inserted into the recess from the inside of the vessel and is turned one-fourth of a revolution, so as to bring the inclines respectively of the bolt head and of the recess face to face, and thereby lock the bolt head therein; in this position the bolt is tightened up by the nut in the usual way, a small space between the top of the bolt head and the bottom of the recess being left to relieve the bolt from the effects of percussion, when the armour is struck by a projectile.

[Printed, 1*s.* 8*d.* Drawings.]

A.D. 1863, August 6.—N° 1939.

HODGSON, William Proder, and WOODIFIELD, John Vaux.—The object of this invention is to obtain rapidity and perfection in the working of machinery adapted to the manufacture of rivets. The machine described operates by means of a disc or die holder, mounted on a horizontal axis and caused to revolve intermittently by means of a cam carrying a stud, which at each revolution of the cam enters into one of a series of slots, cut radiatingly in the periphery of the disc, at intervals corresponding with the circumposed number of dies with which the outer face of the disc is furnished. The end of the metal rod is presented and thrust into the dies, in succession as they come round, by a pair of feeding rollers, which are actuated at intervals corresponding with the movements of the disc, by means of a ratchet wheel and pawl operated by a jointed lever, which is actuated by an adjustable pin, that fits in the radial slot of a revolving disc. The end of the rod which has just entered the die then coincident with the feeding rollers, is cut off by a fixed and moving cutter, and at the next movement of the disc is brought directly opposite the head moulding die, which comes forward and forms the head, the feeding and heading motions being timed to coincident with each successive movement of the disc, as also a clearing bar, which, as the finished rivets in the disc come round, pushes them by turns out of the dies. Cold water in a reservoir placed beneath the disc, cools the dies in succession after every operation.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1863, August 10.—Nº 1967.

FULLARTON, John Alexander.—This invention relates to a mode of fastening metal bands on packing bales, to the machinery or apparatus employed for flattening, and punching the necessary holes on the ends of the bands, and to the rivets or fastenings, which are severally made in the form of a short stud with a flat head at one end, cut away at two opposite sides, so as to form a kind of crosshead at one end, and they have a square head at the other. The holes cut in the ends of the bands are oval, or slotted, corresponding to the form of the crosshead which, when the bands are placed round the bales and the holes at the ends lapped together, is passed through the holes in the two ends, and locked by a quarter of a turn of the rivet by means of the square on the other end. When the compression of the bale is relieved, the bands tighten, and the rivets are drawn to the ends of the slots.

The machine or apparatus employed to flatten the ends of the band and punch the rivet slots has a table and anvil block. It operates by means of two eccentrics, one being employed for flattening the ends of the bands by means of a ram, and the other for operating the punch which makes the slotted holes.

An apparatus for tightening the bands on the bales is also described and illustrated.

[Printed, 10d. Drawings.]

A.D. 1863, August 12.—Nº 1988.

CORNFORTH, John, and ANDREWS, Alfred.—This invention, relating to screw rivets and other nails and spikes, consists—

1st. In forming the points of such articles by an oblique cut deviating from the axial line about 25°, so that the slanting transverse sectional configuration shown at the end represents a long oval. According to the examples shown in the drawings, the shanks are parallel throughout their length; they have a head formed at one end, and the point or end is eccentric, sloping from one side to the other. The advantage of such a form for the piercing end of the screw rivet or nail is, that when it comes in contact with a hard substance, it easily turns and clinches, particularly in the fastening of soles to the upper leathers of boots and shoes, the point turning up as soon as it touches the iron block or last.

2nd. Making across the back of the nail, near the point or end, a series of narrow cuts or nicks, in order to weaken that part which, when the nail end begins to turn and clinch, becomes concave.

[Printed, 8*d*. Drawing.]

A.D. 1863, August 31.—Nº 2148.

BEBBINGTON, George, and HAMPSON, Jonathan Robert.—(*Provisional protection only.*)—This invention relates to the manufacture and use of fastenings to be employed instead of the ordinary rivets, for the purpose of securing the ends of the metal bands used in packing bales of goods, and to the apparatus employed in making the fastenings, and the necessary holes in the ends of the bands.

These fastenings represent a double-headed rivet, the head at one end being made in the form of a T, for the purpose of passing through slotted holes in the ends of the bands, when they are lapped together round the bale. The other end of the rivet is furnished with an ordinary button head, and when the bands are in their places round the bale, they are secured by a quarter turn of the rivet, so as to bring the T heads across the slotted holes.

The rivets are made by means of a pair of dies, each die being recessed to form one longitudinal half of the rivet, and when the end of the bar is pressed between the dies by the motive power, it is simultaneously cut off by the edges of the dies.

The slotted holes are made in the bands by punches of the requisite form, by means of an apparatus operated by hand.

[Printed, 4*d*. No Drawings.]

A.D. 1863, September 3.—Nº 2174.

DURAND, AMAND LOUIS.—(*Provisional protection only.*)—This invention relates to a peculiar mode of manufacturing nails to be used for upholstery work and other similar purposes. It is stated by the inventor as follows :—

"I stamp the head upon a pin, which pin has a flat head to enable " it to be fixed firmly by the stamping. I cut out of malleable " metal, by means of a punch, to their proper shape and size, the " round pieces which are afterwards stamped to form the head, at " the same time the punch cuts out the hole in the middle of the " head, to enable it to receive the aforesaid pin, which is formed " of any suitable metal."

[Printed, 4*d*. No Drawings.]

A.D. 1863, October 1.—Nº 2411.

ANDERTON, JAMES JOHN.—(*Provisional protection not allowed.*)—This invention, relating to the manufacture of boots and shoes, " consists of an improved machine for uniting the upper leathers " of boots or shoes to the soles thereof by means of pegs of " wood, brass, iron, steel, or any other suitable metal, the said " machine at the same time manufacturing the pegs to be employed for the aforesaid purpose."

[Printed, 4*d*. No Drawings.]

A.D. 1863, October 30.—Nº 2690.

RUSS, BARNABAS.—This invention relates primarily to the construction of vessels and batteries of war, and incidently amongst divers matters of detail to the application of screw threads, screws, bolts, and washers for various purposes on ship board, and to compositions applicable for coating the bottom of ships, preserving and strengthening marine constructions generally, and for other purposes. In respect to marine construction it refers to the framework of ships and batteries, their hulls and iron plating, bulkheads, hatchways, look-outs, port holes, masts, yards, bowsprits, booms, funnels, steam pipes, cupolas, and armour plates, all of which will be duly noticed in the respective series of abridgments to which they severally belong.

Bolts for securing armour plates and other purposes are made conical, or gradually tapering from the top of the head to within a short distance of the screwed end, where the bolt is so much increased in size, that the diameter at the bottom of the thread is equal to the smallest part of the shank.

Another form of bolt is cylindrical from the top end for a certain distance, and then tapers towards the screwed end, which is enlarged in the same manner, and used for the same purpose as the last.

Another bolt has in the course of its length two conical sections, commencing near the head end, which is cylindrical, to taper for a certain portion of its length, then run parallel a certain distance, and again tapers towards the screwed part.

Washers are constructed of two parts, each having a central hole; one part is a plain disc, and is made to fit into the other part, which is flanged round on one side, and forms a shallow circular box, wherein is placed between the two parts a disc of india-rubber or other elastic material, for the purpose, when placed beneath the head or nut of a bolt, of deadening any shock or longitudinal strain.

Masts, booms, bowsprits, and stanchions are fitted up on the telescopic principle, one section or length being furnished externally with a spiral screw thread, is made to slide within another part or length by means of annular nuts made in one piece, or in three sections fixed in a frame, and wire rigging is tightened up or slackened by means of screws and internally screwed sockets, which are attached to the stays and rigging by ball and socket or universal joints.

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1863, November 4.—N° 2722.

LIVESEY, James, and EDWARDS, John.—This invention, relating to the construction of the permanent way and fastenings for railways, refers principally to chairs, sleepers, and rails, and to the bolts employed for fastening the chairs to the sleepers, and bolting the junction plates to the rails. This latter operation is effected by three bolts, two of which are of the ordinary make, respectively passing through a hole near to the ends of the plate and through holes near the contiguous ends of the two rails, and the other, which is sometimes made tapering or wedge-shaped, passes through the centre of the plate directly opposite the point where the two rails meet, bedding itself in a passage formed between the ends of the rails, by cutting a transverse notch or groove half the size of the bolt in each rail end, neither of which when so secured is capable of rising.

The chairs are fastened to the wooden sleepers by means of hollow spikes, capable when inserted of being expanded by driving into each of them a solid plug. The lower part of the spike is longitudinally divided or slit from the end, extending to about one-third its length, and external from the lower end the spike is parallel for two-thirds of its length upwards, and thence to the top it is made slightly conical to fit to the hole in the chair. The internal concentric cavity is conical at the top, then becomes parallel, and finally tapers towards the lower end, where, excepting the slit which divides it, it is nearly solid. The plug has a hemispherical head, round parallel shank, and short pointed end; when driven into the hollow spike it expands the divided end of the latter, which thereby becomes dovetailed into the sleeper.

A mode of fixing rails in chairs by means of corrugated steel spring plates is described, also chairs having angle plates with tie-bars, chairs having angle plates with base plates, and an arrangement of a sleeper with three half chairs.

[Printed, 1*s*. Drawings.]

A.D. 1863, November 6.—Nº 2756. (* *)

SAUNDERS, Robert.—(*Provisional protection only.*)—" Improvements in fastening together the parts of ships and vessels, " and in respect to the more efficient caulking of the seams " thereof." This invention consists " in securing the planking, " whether for bottoms, sides, or decks and other parts of ships " and vessels, whether constructed of iron or of wood, to the " beams or other analogous portions or framing thereof, which I " effect by means of what I term T or half T-headed screws, " screwed in alongside the said beams or analagous parts or " framing, and so that the heads of the said screws shall project " over portions of the surfaces of the beams or framing, thus " firmly securing the parts of ships and vessels together. For " caulking I would make grooves in the edges of the planking,

" or introduce metal to form what may be termed a holding sur-" face in the seam, in place of the smooth surface as at present " in the seams of planking or decks."

[Printed, 4*d*. No Drawings.]

A.D. 1863, November 21.—N° 2936.

WATKINS, Francis.—This invention relates to machinery designed for manufacturing bolts, nuts, rivets, and spikes, and to furnaces adapted for heating the metal blanks for such articles, the blanks or rods being inserted through holes in the fire-bricks that form the sides of the heating flue leading from the fire-place, which is double the area of the flue.

The machinery combines on one foundation plate two machines, which may at the same time be differently employed, either of them making nuts or rivets, whilst the other makes bolts or spikes. These machines respectively occupy the intermediate spaces between three upright standards, the contiguous faces of which form the sides of adjustable vertical guides, through which, moved up and down by a crank shaft above, are the slides that carry the heading tools or dies, which are fitted in their lower ends, and require changing according to the nature of the work. The lower dies or heading tools, punches, and appliances required for different kinds of work, are mounted directly beneath the upper tools or dies on sliding carriages, and these are all capable of adjustment or of being changed, the nut forming and punching dies having internal punches for perforating the central holes, whilst the nuts are swaged and shaped externally. At one side of this combined machine there is a pair of cutters for severing the blank pieces from the rods, and at the opposite side, mounted on a revolving shaft, there are two " frasers or finishers " for removing burrs left by the dies, and for finishing.

The heating flue of the furnace is contiguous to the machine.

[Printed, 3*s*. 10*d*. Drawings.]

A.D. 1863, December 2.—N° 3036.

LUNGLEY, Charles.—This invention relates to the construction of ships of war and other vessels, and refers, first, to the iron frames, timbers, double planking, and mode of working the internal plate lining or waterproof shells of vessels of the ordinary class. Second, to the construction of vessels where greater strength is required, and vessels capable of carrying armour plates. The armour plates can be worked directly on to web frames having the required set-in below the line of flotation, for which purpose the inner thickness of outside planking, and diagonal straps or plates, can be secured by bolts passing through the straps, plate, armour plate, and the angle iron on the web frames, and any amount of wood backing can be worked between the web frames, and the armour plating is worked and secured by the same bolts. The frames of war ships of great defensive power are made of solid bar iron instead of web plates, and enlargements are forged at those parts where the bolts, which secure the armour plates, pass through. The diameter of these bolts should be equal to the thickness of the plates; the shanks which pass through the solid bar frames, and the holes in the latter, are screw-threaded with square threads, the end of the bolt is squared to fit into a wrench for the purpose of turning it, and the head may be called conical, consisting in appearance of a series of discs, each one of increased diameter concentrically piled one upon another, and the holes in the plates are formed to correspond, so that every section of the bolt head beds on a flat surface, and not against an incline.

Describes a novel mode of working rudders, and other details not included in this series of abridgments.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1863, December 11.—N° 3118.

DARWEN, Edmund, and HADDON, John.—This invention relates to machinery adapted to the manufacture of metal nails and rivets, especially to those which are made from copper. Into the nail making machine the wire is fed by any of the contrivances in ordinary use longitudinally through a passage in a square slide to between shaping dies, and directly in a line with the heading punch. One of the shaping dies, by an appropriate movement in co-operation with a cutting edge formed on the end of the slide, cuts the wire as it passes through into the required lengths; the shaping dies compress the wire laterally, forming the point of the nail, and holding it whilst the heading process is performed in the usual manner by a heading punch.

In the rivetting machine described, the cutting-off die works in front of and against the fixed die, through which there is a feeding hole for the passage of the wire or rod; a spring finger on the cutting die holds the cut off piece whilst it is moved by the die into position directly opposite a punch, which advances and forces the piece into a heading die; by a movement of the latter, the partially formed rivet is brought in front of the true heading punch, which advances and finishes the rivet. The latter is then pushed out of the die by a bolt or rod.

[Printed, 8*d*. Drawing.]

A.D. 1863, December 11.—N° 3132.

BROOMAN, Richard Archibald.—(*A communication from Jean François Fuzellier Leger.*)—(*Provisional protection only.*)—This invention relates to the manufacture by machinery of nuts, whilst the metal used for the purpose is still hot from the rolling process. The successive operations are described as follows.

1st. "If six sided nuts are to be made I roll a bar of iron hot "between rolls which turn out the bar hexagonal in cross section, "with the angles exaggerated in order that the nut after under-"going the various processes hereafter described may preserve "the angles sharp and clean."

2nd. "I submit the hexagonal bar hot to be divided trans-"versely by circular saws separated from each other a distance "equal to the height of the intended nuts. Where the end of "the bar requires dressing I use a circular revolving rasp."

3rd. "I next mould the blocks separated as last described by "submitting them whilst hot to a press for the purpose of shap-"ing the curved head, and of getting rid of the excess at the "corners or angles."

4th. "The central hole is now formed by a strong punch."

5th. "The nut is finished by being threaded, and is ready for "use. The same process is applicable for four sided and for "round nuts; the bar is rolled in the first instance quadrangular, "and in the latter circular in cross section."

[Printed, 4*d*. No Drawings.]

A.D. 1863, December 23.—N° 3244.

VAN HEES, Richard Edward.—This invention relates to the manufacture and use of a kind of clasp or fastening, for the purpose of securing the ends of the metallic bands of hoop iron employed in the packing of bales of goods whilst under hydraulic and other pressure, instead of fastening the ends of such bands when lapped together by ordinary rivetting. Two kinds of these fastenings are described and illustrated; one consists of a kind of clamp or short metal bar, with the ends turned up at right angles and hooked in the form of a link with one of its sides nearly cut out. The turned up ends are inserted through two elongated holes in the ends of the bands, which holes coincide when the band ends are lapped together whilst the pressure is on the bale, and when the pressure is removed and the expanding strain comes upon the bands, the edges of the holes are drawn under the hooked ends of the clamp.

The other fastening consists of a short plate about the width of the bands, having fixed projectingly from one of its faces two studs; the distance between and the shape of these studs corresponds with the distance apart and the size of the holes in the bands; in front of each stud there is a cross nick towards one end of the plate, into which the edges of the ends of the holes in the lapped end of the band are drawn, when the bale is relieved from the pressure.

[Printed, 8*d*. Drawings.]

1864.

A.D. 1864, January 4.—N° 21.

BAYLISS, Moses.—This invention relates to a machine adapted for cutting screw threads on bolts and screws and tapping nuts. The machine comprises a circumposed series of screw cutting dies severally carried by spindles radially mounted on appropriate pedestals, and respectively made capable of rotation in either direction by means of a sliding clutch and bevel gearing, which by means of a corresponding number of pinions, that engage with a central horizontal spur wheel fixed on a main central vertical axis, obtain motion therefrom. When the machine is in motion, all the spindles on one side are revolving in one direction, and those on the other side in the opposite direction, the motion being, at opposite diametral points as it comes round, reversed by a revolving stay. The bolts and nuts are held in self-acting holders, which are severally disposed, one directly opposite the end of each *spindle*, and capable of sliding radially in a line therewith when the dies or taps are in operation, during which time they are kept cool by streams of soap water, conducted to them through suitable ways. The machine may be altogether employed in tapping nuts, or cutting threads in bolts, or it may be so arranged that every alternate spindle is engaged tapping nuts, and the intermediate spindles in cutting or threading screws, the spindle ends being correspondingly furnished either with taps or dies, and the nut feeder or the bolt holders, arranged in accordance therewith.

[Printed, 1*s*. Drawings.]

A.D. 1864, January 27.—N° 232. (* *).

PAKKES, Francis.—(*Provisional protection only.*)—"Improve-" ments in the manufacture of horse-shoe nails."

The nails are made "from strips or bars of mild cast steel " or homogeneous iron or steel," having a breadth equal to the length of the nails to be made. These bars are placed between rolls having such a figure as will give to the bars the form, in transverse section, of the nails to be made. The rolled strips or bars are then annealed, and cut up transversely to form horse-shoe nails, which are annealed to reduce them to the proper temper and pliability for use.

Or bars may be rolled to have, in cross section, the figure of two horse-shoe nails jointed point to point. They are treated in the same manner as those above described. The joined nails are divided and their points perfected.

[Printed, 4*d*. No Drawings.]

A.D. 1864, February 17.—N° 411. (* *)

COLES, Cowper Phipps.—(*Provisional protection only.*)—" A new apparatus to be employed in fastenings for armour " plates on ships, and in other like fastenings where bolts and " nuts are used." "My new apparatus is a conical washer, which " is inserted with the taper end foremost over the threaded end of " the bolt, and is screwed up by the nut. In some cases I make " the washer and nut in one piece."

[Printed, 4*d*. No Drawings.]

A.D. 1864, February 18.—N° 417.

WATTEEU, Emile.—(*A communication from Charles Ryan.*)—(*Provisional protection only.*)—This invention, relating to " ma-

" chinery for making railway spikes, rivets, bolt blanks, and " similar articles" "consists of a pair of feeding rollers with " cams, by which the bar of heated iron or other metal is drawn " into the machine, and the end thereof is tapered or otherwise " shaped and then cut off; these rollers have an intermittent " rotary motion given to them by a ratchet wheel and catch lever, " or other suitable gear. When the end of the bar is cut off it " is taken hold of by a pair of gripping claws, by which it is held " in a die, the upper part of which is connected to a lever; this " lever is brought down upon the spike, rivet, bolt blank, or other " article under operation, and securely holds it while the heading " ram is brought against the end of it to form the head, the lever " is then raised, and the railway spike or other article is pushed " forward by the portion of the bar behind it, which has then " been taken hold of by the gripping claws which cause a fresh " portion of the bar to be drawn under the lever for having the " head formed on it. The finished spikes or other articles drop " into a suitable receptacle under the machine. The operations " are performed uninterruptedly until the whole bar has been " made into spikes or other similar articles, that is to say, while " the head is being made on one spike or other article, the feeding " rollers are drawing forward, tapering, and cutting off a portion " of the bar to make another. The gearing for giving motion to " the various parts is so constructed that by means of handles or " treadles, starting rods, and levers, the whole or any portion " of the machine can be suddenly thrown out of and in gear."

[Printed, 4*d*. No Drawings.]

A.D. 1864, March 21.—Nº 711.

REILLY, James.—This invention relates to the use of screw-bolts and nuts of a particular form, and also to ordinary screws and nuts to be used in the manufacture of chairs, couches, and such like articles of furniture, whereby to fix together more firmly the frames, legs, etc. heretofore united only by tenons and mortices, glued or pegged. The system in some respects resembles the usual mode of fitting together the frames of bedsteads, which consists of drawing the tenons in the mortices by means of bed-screws and ordinary nuts, which are let into the solid part of the frame or rails that carry the tenons, and the screws inserted through the frames or rails which are morticed, the direction of *the screws being* in a line with the tenons.

The nuts employed consist of short lengths of round bar iron screw threaded externally and cross nicked at one end; the hole which is tapped to receive the end of the screw is drilled transversely through the nut pieces, and the holes for the bolts are made through the other part of the frame, and into the first part in the direction of the tapped hole in the nut piece, the position of the bolt and nut varying according to the form and angle of the surfaces they are required to draw together and unite.

In some cases ordinary square nuts are fitted or deposited edgewise at the bottom of mortices to secure side or other frames, the screws passing through the solid material of the mortice slide.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1864, April 16.—N° 966.

HASELTINE, George.—(*A communication from William Chisholm.*)—This invention relates to the manufacture by machinery of metallic nut-blanks.

The machine employed consists of a strong bed plate, carrying at one end two strong abutment pedestals, whereon the main cam shaft is mounted to the revolve. Fixed on this shaft are two side cams and one central main tappet cam, which give at each revolution of the shaft, and in a direction at right angles thereto, a forward thrusting movement to a strong mandril, which slidingly reciprocates in fixed guides, and carries in a recess at its outer end a male die secured by a jamb block and set screw, the return movement of the mandril being due to the side cams. The sides of the die box which contains the female shaping die, are composed respectively of movable pieces, adjustable by means of bolts. When the bar of nut iron taken at a proper heat is introduced at the point directly in front of the shaping die, a piece sufficient for a nut-blank is cut off by the forward movement of the mandril and forced into the shaping die, the central hole in the blank being punched at the same time by an adjustable fixed punch which passes centrally through the shaping die, the burr being driven through a hole in the male die into a curved passage in the mandril, falls down through an opening in the underside, whilst the finished nut-blank, pulled off the punch by the retreating mandril which draws the shaping die forward, falls through an opening in the bed plate. The main central cam tappet works in a slotted opening in the end of the mandril, and moves it by means of an intervening steel friction plate, which slides against the end of the mandril when pressed upon by the cam.

[Printed, 8*d.* Drawing.]

A.D. 1864, April 16.—Nº 968.

SMITH, Arthur William.—This invention relates to the making of pegs and rivets, and to pegging and rivetting boots and shoes. It is described as follows:—

"Upon a shaft having its bearings in the main framing I secure " circular knives, which I use for cutting planks or pieces of wood " for the pegs into strips. Connected to the end of the main " shaft, and supported by a rocking shaft secured to the main " frame, is the working head of the machine, which is actuated " by the movements of the crank gearing. After having formed " the strips the whole of the gearing and the working head are " brought down upon the boot, shoe, or material under operation, in which position the same is secured by a locking cam " keyed on the shaft first mentioned. This being performed, " the revolution of the said shaft continuing, an awl or piercer is " put in action, which pierces the hole in the boot, shoe, or material, and upon further continuance of revolution a bolt is " withdrawn which secures the wood or wire slide, and permits " it to be drawn down by an elastic spring, which is attached to " a lever working knives for cutting off the pegs from the said " strips (or rivets from wire), and pointing the same at one " motion, the upper part of the said spring being secured to the " grippers or wood slide secured thereto, a hook being secured " just below on the end of a removeable gauge piece for regulating " the length of the peg or rivet. The strips (or the wire) I then " place in the grippers of a wood or wire carrier, and thus convey " the same to a tubular guide, which rests upon the boot, shoe, or " material to be worked, and when the end of the strip is at this " point it is cut off by the dividing and pointing knives before " referred to. This being done, the upper portion of the strip is " withdrawn by the tappet end of a crank acting in the angled " part of the slip or wire carrier, and there locked in position by " the aforesaid bolt, which is acted upon by a metal spring. " The further revolution of the first-named shaft then brings " down the hammer or punch, which forces the peg or rivet into " the boot, shoe, or material under operation, when the camb bolt " *before* mentioned is released from a ratchet, and the gearing is

" by a spring acting beneath the rocking shaft supporting the " working head and gearing drawn up, which releases the boot, " shoe, or material under operation."

[Printed, 10*d.* Drawing.]

A.D. 1864, April 23.—N° 1035.

GRICE, Frederic Groom, and BENNETT, Henry.—This invention relates to machinery adapted to the making of hollow iron keys or wedges, and hollow spikes, applicable to the fixing of rails in railway chairs. These hollow keys are made from flat bars of heated iron of the required width and thickness. Mounted at the side of the machine employed, there is a pair of cutting shears, for the purpose of severing from the flat heated bar, pieces of the required size. These pieces are in succession placed flat across a hollow trough or die, the bottom and sides of which are made to form three sides of the hollow wedge by means of a plunger, which descends and forces the metal piece into the trough die, turning up the two ends of the piece, which project above the sides of the die. When the plunger rises the partly formed wedge is kept down by a clearing piece, and by means of a horizontal slide, it is pushed along the trough die to between two horizontal sliding dies, and beneath a pressing bolt. A mandril in form and size corresponding with the internal cavity of the finished wedges, is then laid in the half formed wedge piece, and by the simultaneous closing of the horizontal dies, its turned up projecting ends are folded over, and closing upon the mandril are pressed upon by the lower end of a vertical bolt, which descends and gives the final shape to the wedge, by forcing it into the trough die. The mandril is afterwards drifted out by an apparatus attached to the machine.

A modification of the machine is described and illustrated.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1864, April 26.—N° 1048.

BUSH, Francis.—(*A communication from George Burley Wiggin and John Waldron Hoard.*)—The object of this invention is to improve the constructive arrangements and mode of working machines for cutting nails, and to adapt a contrivance for grinding the cutters and dies. To this end, the two heading die levers, two stirrups, and two toggles, are combined with the oscillating cutter head.

The heading dies are applied in the form of plungers, free to turn on their axes.

Employing two hooks attached to the heading levers to operate upon two flanges, disposed on the heading dies for the purpose of drawing back and turning the dies.

Arranging a single pair of nippers to co-operate with two sets of holding dies.

Supporting the whole feeding apparatus on a slide carriage having a transverse movement, a standard on which it is free to turn, being pivotted thereto.

Opening the tongs by means to two pins.

By means of guides, raising the carriage of the feeder, so as to turn the latter away from the cutters.

Arranging two grinding wheels on a movable carriage for the purpose of grinding the holding dies, and also a wheel and carriage for grinding the movable cutter.

The nails are transversely cut with the usual tapering form from plates so presented by the transverse movement of the feeder carriage to the two pairs of cutters, that the thick and the pointed ends of the shanks respectively, are alternately cut from the opposite sides of the plate.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1864, April 28.—N° 1072. (* *)

GHISLIN, THOMAS GOULSTON.—" Improvements in the treat" ment and application of seaweed." The patentee employs any of the common kinds of seaweed, and, having treated them in the manner described in the Specification, No. 2035, A.D. 1862, dries them and reduces them to an impalpable powder, or, if they are operated upon when wet, makes them into a paste. The powder or paste is incorporated with the following ingredients or some of them, and in proportions according to the articles to be manufactured; gums, gum resins, including india-rubber, gutta percha, and substances of that class, resins, natural or artificial, bituminous substances and the products of the same, paraffin and oily or fatty substances, fibrous materials, the silicates of potash and soda, pulverized chalk, talc, and other earthy matters, metallic oxides, gelatine, farina, alum, tungstic acid, powdered charcoal, and other analogous substances. He states the particular ingredients and the proportions which he prefers, according as he requires tenacity, elasticity, solidity, or durability. He mixes and incorporates the mass in a masticator provided with rollers or other mechanism, and then passes it between cylinders. He enumerates the various purposes for which this "algæite" is available; amongst them are washers. The compound may be hardened and rendered impermeable to water " by steeping it in boiled oil, or in any drying oil, or in a solution " of gum or resin, or in any kind of varnish."

[Printed, 4*d*. No Drawings.]

A.D. 1864, April 30.—N° 1089.

BURDICT, Orrin Clark.—This invention relates to nut making and swaging machines, and to the dies employed.

1st. The operating parts of the machine are mounted on a horizontal bed plate, which is supported by standards and carries on one end in appropriate bearings, a cam shaft, which is driven by a strap pulley. The bar of nut-iron in a properly heated state, is presented to the cutters by a sleeve which slides through the shaping die and is held firmly in position by means of levers, operated by a cam on the cam shaft. Another cam then moves forward a slide and punch, whilst the sleeve simultaneously retires, and the cut-off piece being held between them, is carried into the shaping die which consists of two parts, respectively concave and convex, for shaping the nut externally in co-operation with the punch, and for giving to the face of the nut the requisite curved form. The central tapping holes are made by a stationary punch, which passing through the sleeve projects from the bottom of the die, and the pellets are driven through a hole in the movable punch which is advanced by the slide; finally the finished blank is forced from the die by the sleeve.

2nd. Relates to the construction of swaging dies which consist of "four separate pieces, each piece in its breadth and depth equal " to the nut or piece to be swaged, and in length about three " times its width, or more or less. The said pieces or blocks are " so placed that each block will form one of the four sides of a " die, and when the outer angle or corner or face of the die shall " have become worn by use, the block or piece may be shifted to " present a new face or angle. Each end of each block allows " three such changes, and the sides an equal number, and thereby " no repairing is required, until all the angles have become used " and worn."

[Printed, 10*d*. Drawing.]

A.D. 1864, May 13.—N° 1214.

BOUSFIELD, George Tomlinson.—(*A communication from Hayward Harvey.*)—This invention, relating to "machinery or "apparatus employed in the manufacture of screws," consists of,—

1st. Several modifications and devices for arranging in regular order and feeding screw blanks to the shaving, nicking, and threading apparatus. The blanks without any regard to order are thrown into a pan or receptacle with open cuts or slots in the bottom. Into these slots the blanks either fall or are swept in by a brush, and hanging by the heads in rows are distributed upon inclining forwarding ways, which deliver them to the several machines and apparatus employed in the subsequent finishing processes, or to a number of machines engaged in the same operation.

2nd. The shaving machine, which shapes the heads by means of two cutters revolving with a carrier on the end of a spindle. These cutters act simultaneously at the opposite sides of the head; the blanks as they are received from the forwarding ways are brought in succession into position opposite the centre of the spindle by a series of conical split sockets, projecting from the periphery of an intermittently revolving wheel; the axle bearings of this wheel have a horizontal movement, and as the sockets with the blanks by turns come opposite the cutters, they are by the horizontal movement of the wheel thrust into a conical frustum fixed opposite the spindle centre. By this means the split sockets are made to close and grip the blanks whilst the cutters operate.

3rd. Apparatus for nicking the heads of screw-blanks, which are received from the forwarding ways and held by grippers, whilst the nicks across the heads are made by a circular saw or other cutting instrument.

4th. Apparatus for cutting threads on screw-blanks. "This "machine is intended to act upon blanks that have already been "nicked and shaved, and consists mainly of a series of sliding "and rotating receivers and holders acting in combination with "a screw driver to revolve the blanks, and a tool which has "imparted to it the proper motions to cut the threads thereon."

The last part of the invention relates to a delivering apparatus *which "consists* of an ordinary inclined conductor bent or curved

" near its end, in which slides a gate that permits the blank to " drop, or shoves them out one by one from the end of a column " and holds back the column until it becomes requisite to drop " the next blank in succession."

[Printed, 4*s*. 10*d*. Drawings.]

A.D. 1864, June 7.—N° 1411.

AVERY, William.—(*Provisional protection only.*)—This invention relates to a grinding machine adapted, amongst other purposes, for grinding with greater precision the cutting tools employed for turning or shaving the heads of wood screws and similar articles. The grindstone is mounted to revolve on a horizontal axis, the lower part of the stone dipping into water contained in a trough, a depth regulated by making the bearings which support the axle adjustable, and capable of sliding up inclines by means of screws worked by a hand wheel. A hollow cylindrical tool-holder is mounted in front of the machine, and by suitable contrivances is made to traverse and carry the tool across the face of the stone; the tool-holder is also capable of partial rotation, so as to be able to present the tool to the stone alternately at the two requisite angles for sharpening the cutting edges.

[Printed, 4*d*. No Drawings.]

A.D. 1864, June 21.—N° 1535.

THOMPSON, John.—This invention, relating to machinery for shaping, cutting, and grinding, is adapted to the grinding of bolt heads, and other articles of a hemispherical or cylindrical form instead of turning them in a lathe. "The bolts or other articles " are fixed in spindles revolving in bearings attached to a chuck " or face plate; the spindles are turned round by a wheel which " is eccentric to the axis of the chuck or face plate gearing into " pinions on the spindles. Beyond the circumference of the " face plate are a series of consolidated emery rollers or other " grinding surfaces and a pair of cutters. As the face plate " rotates, the bolt heads or other articles are presented in succession to the cutters, which reduce their edges to the proper " diameter, and to the grinders, the shape of which must be " made to suit the article to be operated upon. When the bolts " or other articles have passed beyond the last grinding surface

" the pinions on the spindles are out of gear with the eccentric
" wheel, and the attendant then removes the finished bolt or
" other articles and replaces them with others to be operated
" upon. The mode of driving the spindles may be varied
" by mounting two or more bevel wheels on studs revolving in
" the face of the chuck, to which studs are fixed other wheels
" which come into gear with the eccentric wheel. A modification
" . . . . . consists in fixing the bolts or other articles in
" spindles passing through the face of the chuck, and in causing
" the spindles to revolve by a centre spur wheel gearing into
" pinions on the spindles. The grinding surface is concentric
" to the chuck, and in revolving acts on the bolt heads or other
" articles to be operated upon as they are presented to it."

Describes the process of trueing and polishing the surface of tooth and other wheels, pulleys, and other articles.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1864, June 29.—N° 1628.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Almond Glover and Edward Shelton.*)—The objects sought by this invention, which relates to machinery for making nuts, are simplicity in construction, increased working speed, improved mode of working and cooling the dies, and better quality in the nuts produced. A bar of nut-iron taken at a white heat is placed against the guiding edge of a frame, and slid up to a stop gauge, which is adjusted to the required size of the nut. An advancing cutter co-operating with a fixed cutter, cuts off a blank piece and pushes it into a carrier, whereby it is brought into position in front of a die block. The front die then advances and pushes the blank piece into the die box, at the same time that the back die recedes, and when fairly in the box the piece is perforated by a punch, which comes forward with a quick movement and forces the pellet through the front die, which advances, and the nut blank is compressed in the die box between the two dies and squeezed into the required shape. The front die then retires, and the back die advancing pushes the finished blank out of the die box. The time occupied in forming a blank is whilst the main cam shaft makes only a quarter of its revolution, the dies resting during the remainder with cold water flowing upon them. The nut blanks by the rapid movements of the operating parts are *formed before* the metal has time to chill, and in order to reduce the rough edges left by the cutters respectively on the blank piece and the bar, the latter is turned over after every successive cut, so as to bring both rough edges on one side of the next piece that is cut off, in order that it may easily enter the die box, and the rough edges be compressed into the body of the blank by the dies.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1864, July 13.—Nº 1740.

SPENCE, William.—(*A communication from George Henry Knight.*)—This is an invention of machinery adapted to the manufacture of nut blanks. The operating parts of the machine for cutting, swaging, punching, and hammering, are actuated by cams through the intervention of appropriate connecting mechanism. The end of the heated bar out of which the blanks are made is fed into a cavity in a movable jaw, which, acting in conjunction with a fixed holding jaw, cuts off from the rod at each move a piece the required length. The cut off pieces following each other in succession are, by means of a pusher and spring guides, placed under a swaging die, which forms the face of the nut, and at the same time the central hole is made by a punch, which is contained in the swaging die, and operated by a tappet cam whilst the blank is held down by the die. Thence the blanks in succession are advanced by the pusher against a yielding holder and placed on the point of a mandril, which is then elevated by a cam, and the holder is retired by a spring. Whilst upon the mandril, the sides of the blanks are subjected to the operation of two horizontal acting hammers, which are projected by strong springs and withdrawn by cams, resistance being afforded by fixed anvils, the nut blank under process being held on the point of the mandril by a clamp, which is brought down by a cam. When liberated from the mandril, the blanks in succession are moved by a finger into position beneath a vertical trip hammer, which gives them the final top and bottom finishing touches.

[Printed, 10*d.* Drawing.]

A.D. 1864, July 13.—Nº 1746.

LEWIS, John.—This invention relates to machinery adapted for making bolts, rivets, spikes, and such like articles having square or other shaped shoulders, and to so contiguously placing a furnace near the machine that the iron rod out of which the articles are made passes through it and is heated on its passage, entering into the machine between grooved feeding rollers, which advance it intermittently a regulated distance by means of a ratchet and adjustable pawl through a hole in the frame of the machine into a bell-mouthed opening in a steel shear plate, by which the pieces are cut off and then they are severally held and rolled between two pressure blocks which reduce the stem or shank to the required size. These blocks carry the shaping dies which form the shoulder and also the head if square or hexagonal, but if required to be round or snapp the head is moulded by a heading tool which is advanced by an eccentric. When the heading tool retires the finished bolt or article is struck out of the dies by a "tipping pin." The machine is self-acting throughout, all that is required is the entering of the bars between the feed rollers, and the keeping of the dies clear of ends and waste pieces.

[Printed, 10*d*. Drawing.]

A.D. 1864, July 22.—N° 1829.

PESKETT, Frederick.—This is an invention of a rivet making machine which operates by means of two discs or die holders mounted to revolve on horizontal axes, the outer face of each disc being furnished with a circumposed series of dies set apart in holes made through the discs at corresponding radial and segmental divisional distances. The two discs are caused to revolve intermittently, moving alternately at corresponding intervals by means of two pawls which, obtaining motion from a crank pin, act by turns upon ratchet teeth formed on the periphery of the discs. A rivet is made in each of the dies every complete revolution of the discs, the dies severally as they come round being brought in succession into position to receive the metal pieces which are cut from the ends of the heated rods by reciprocating cutters, and falling through a guide into position opposite the holes in the back of each disc respectively, are forced so far through by punches into the dies that sufficient of the end to form a head on the rivet piece is caused to project directly in front of the heading die, which then advances and by pressure moulds the head of the rivet, the forcing through punch in each disc resisting the pressure of the header, and determining in conjunction with the feeding apparatus the length of the rivet shank. The finished rivets are subsequently by turns pushed out of the dies of each disc respectively at the next stopping point in their revolution by punches which enter through the die holes from the back.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1864, August 4.—N° 1938.

SOUL, Matthew Augustus.—(*A communication from John Gregory.*)—This invention relates, first, to the manufacture of dogs, spikes, bolts, and nails to be employed for securely fastening together the different parts of a structure, and particularly the rail chairs to railway sleepers, in the latter adaptation the advantages as compared with the old spikes and fastenings being greater efficiency and holding power, safety and reduction in cost of maintenance, as the improved fastenings it is stated will not become loose when once properly fixed.

To this end these fastenings are made in two parts, somewhat resembling a spike nail split longitudinally into two parts, the pointed end of one part being angularly bent outwards. When fastening chairs to sleepers the hole is first made in the sleeper in the usual way, and then the part with the crank end is inserted. The other part when driven acts as a drift or wedge between it and the side of the hole and forces its projecting cranked end laterally into the timber. In some cases the part which acts as a cutter or wedge may be made of hard wood.

2nd. Relates to the wooden keys or wedges employed to secure the rails to the metal chairs, and consists in forming on one or both sides of the key, a groove to be filled with gutta percha or compressible material, which may be dissolved or applied in a cold state to act as a glue when dissolved by the heat of the rails, the object being to prevent the loosening and working out of the keys.

[Printed, 10*d*. Drawings.]

A.D. 1864, August 4.—N° 1948.

BRAMWELL, Frederick Joseph.—This invention relates to machines adapted to the manufacture of nut blanks, and is described as follows :—

"I employ a machine by which I indent the end of a bar of " iron or other metal heated if required to the desired temperature. " The indentation is made parallel or nearly so to the axis of

" the bar and is by preference made as deep or deeper than the " thickness of the intended nut. From the indented end of the " bar is severed a piece of sufficient size to form the nut. The " indentation at the end of the bar of metal may be effected " while it is within a die of the form of the exterior of the nut, " or this indentation may be made while the end of the bar is " not in such a die, in which latter case the piece to form the " nut after being severed from the bar is operated upon by an " internal or external die or dies, or both, so as to bring it into " the right form, or, if desired, the piece of metal even when " indented in a die may be subsequently operated on in other " dies. In order to facilitate the formation of the nut it is " preferred that the section of the bar of metal should be similar " to that of the intended nut."

"The machine is provided with a stop or gripping arrange- " ment for holding the bar while being indented, and the indented " piece when cut off is carried to the finishing dies, from which " it is discharged when finished; or, if desired, the finishing dies " may be brought up to receive the piece, which when finished " will be discharged therefrom. The indented end of the bar " is cut off therefrom either by shears or by a saw, and a nut " blank with a hole through it is thus formed."

Modifications of the machine are described and illustrated, and three diagrams shew the precise points in the revolution of the main shaft at which the various movements of the operating parts begin and terminate.

[Printed, 1*s*. 6*d*. Drawings.]

A.D. 1864, August 19.—N° 2057.

WALDENSTRÖM, Eric Hugo.—This invention, relating to the manufacture of nut blanks, consists in the employment for the purpose "of two metallic 'die boxes,' within one of which a " moveable plunger is used, the other containing a stationary " plunger, that is to say, the three moving parts are the two " halves of the die box, and one of the plungers only. The bar " of metal from which the blank is to be formed is placed between " the two halves of the 'die box,' which are brought together by " two eccentrics on one rotating shaft and connecting rod, so " that a portion of one half of the 'die box' enters the other, " *thus cutting* off the blank from the bar, and compressing it

" within the then closed die. Simultaneously with this motion, " and actuated by the same eccentric, the moveable plunger in " one-half of the 'die box' proceeds forwards, and compresses " the centre of the nut against the stationary plunger, so as to " form a hole nearly through the nut, then the other half of the " 'die box' moves forward, and further compresses the nut, " and also presses the piece remaining in the hole against the " moveable plunger, thus forcing it out, and completing the hole; " the die boxes then recede, and allow the nut to fall clear, and " by which movement also the waste piece punched out of the " nut is delivered, and the apparatus is ready to form another " blank."

[Printed, 10*d*. Drawings.]

A.D. 1864, September 1.—N° 2150.

FOWLER, THADDEUS.—This invention relates to a "method of " coating pins and other articles with tin or other metal."

The process of coating pins and small articles with metal had been in practise heretofore, but a difficulty existed in separating the pins and articles, which were apt to stick or become soldered together when taken out of the coating pan. The object of the invention is the separation of the pins before the metal with which they are coated has time to cool. The pins and articles previously prepared by muriate of zinc are placed in the coating pan along with a sufficient quantity of the coating metal, which is in a granulated state. The pan is suspended over a furnace, and as the metal melts, it attaches itself to the pins or articles which during the process are kept in motion by an apparatus that combines a rolling and rocking action for agitating the pan. When all the pins are coated, and the metal thereby diffused and absorbed, the pan is upset into the upper one of a series of wire riddles or sieves, to which a compound vibratory and trembling or shaking motion is imparted mechanically; this has the effect of separating the pins or articles which fall through the interstices or meshes of the sieves into water contained in a receptacle beneath.

[Printed, 8*d*. Drawing.]

A.D. 1864, September 2.—N° 2161.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Hyppolyte Brocard and Edward* Hunniball.)—This invention consists in the employment of grooved or longitudinally-indented strips of lead, which, bent into the form of rings or otherwise, are used as washers or packing between the flanges of pipes beneath the heads of bolts and nuts, and between metallic surfaces generally, which require to be hermetically united. In forming such grooved or indented leaden strips into rings for packing, the strip is bent into a circular form, and the ends are brought together in a kind of scarf joint, and when applied and placed in position to form a hermetic connection between two surfaces, the pressure of the latter, as they are drawn together by bolts or otherwise, crushes the lead strip, and compels it to take the form of the space between the surfaces, to all the irregularities of which it is thereby brought into intimate contact. The transverse sectional form of the strips may be varied, and instead of being grooved so as to produce longitudinally-edged projections, they may have a lozenge form, and be either rolled or cast. Thin leaden wire, round or of other sectional form, may be used round the shanks beneath the heads of bolts and nuts.

[Printed, 8*d*. Drawing.]

A.D. 1864, September 3.—N° 2166.

GREENFIELD, DANIEL.—(*Provisional protection only*.)—This invention, relating to the manufacture of screw-eyes, adapted for holding stair rods, picture rings, and such like purposes, consists in making such articles from wire, instead of by casting or cutting them from sheet metal by means of dies.

The machinery employed is somewhat similar to that which is used for making button shanks, and the wire out of which the screw-eyes are made, may, in cross section, be either round, half-round, square, or other suitable or desired form. When round or square wire is used, it is bent round to form the eye, and then cranked down to form the shank, which is cut to the required length, and screwed; and when flat or half-round wire is employed, after being bent round to form the eye, the two ends are cranked down, and the two flat surfaces being brought together form either a round or square shank, which may be afterwards screwed. When a shoulder is required round the neck of the shank, it is made by a well-fitting washer or collar, or a piece of tube. Brass eye-bolts are finished by dipping and laquering in *the usual way*, and those made of iron may be either partly or entirely japanned, bronzed, or coated with white or other colored enamel.

[Printed, 4*d*. No Drawings.]

A.D. 1864, September 5.—Nº 2169.

NEWTON, ALFRED VINCENT.—(*A communication from William Wickersham.*)—This is an invention of machinery devised for cutting nails from steel metal "in an efficient and expeditious manner." Two sets of cutters, which alternately act upon the metal nail sheet, are respectively fixed so as to project at the opposite sides from the periphery of a revolving cylinder; these cutters, as they by turns come round, co-operate with stationary cutters, which are fixed to the bed of the machine. The sheet of metal is presented to the cutters by a pair of feeding rollers, to which the requisite intermittent rotating motion is imparted by a ratchet wheel, and simultaneously the rollers receive a longitudinal movement, in order that the metal sheet may be moved laterally into the required position to suit the operation of both sets of cutters, which, for the purpose of giving to the cut nails a tapering form, are set somewhat deviating from a parallel with the axis of the cylinder, the form of the cutters determining the shape of the nails.

A cylinder of sufficient length may be furnished with such a number of cutters, set to follow each other in the cut, that a whole sheet of metal may be operated upon and cut into nails without being first cut into strips.

A modification is described and illustrated showing a broad ended lever or cutter jaw, furnished across its end with a series of cutters fixed so as to cut endwise, and severally placed to follow each other in the cutting operation. The metal sheet, held by two pairs of pincers or tongs, is presented to the cutting jaw upon a shifting frame.

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1864, September 13.—Nº 2236. (* *)

RITCHIE, JOSEPH HORATIO, junior.—"Improvements in bolts "used in the construction of ships and vessels." . . . . "This "invention has for its object the insulation of bolts used in the "construction of ships or vessels, more especially those built with "iron frames planked with wood, so that if iron bolts are employed “they shall not be wasted by the galvanic action caused by their contiguity to the copper or yellow metal sheathing; or, on the other hand, if yellow or composition metal bolts are used, they shall not have any injurious effect on the frames through which they pass. In order to accomplish this object, I cover the bolts entirely or on those parts contiguous to the dissimilar metals with caoutchouc, or caoutchouc and gutta percha, or other mixture in which these form essential ingredients hardened by the process known as vulcanization.” The iron head of the bolt is generally entirely covered with the insulator, but in cases “where great percussion has to be borne by the head, it may be found desirable to allow a portion of the centre of the iron head to project a little above or be flush with the surface of the vulcanite so as to receive the heavy blows; the portion of iron thus left uninsulated may, after the bolt is driven, be easily covered with any insulating material.”

“The composition of the vulcanite or ebonite I prefer to be such that it shall at the same time be tough as well as hard. I have found that a compound of caoutchouc masticated with from $\frac{4}{10}$ths to $\frac{5}{10}$ths its weight of sulphur laid on the bolt in a plastic state, and tightly bound thereto with tape or other material, and exposed to a heat of 300° Fahrenheit for from three hours to four hours answers the purpose well.”

[Printed, 6*d*. Drawing.]

A.D. 1864, September 24.—N° 2351.

WHITTLE, William.—This invention, relating to machinery adapted to the manufacture of nails, spikes, rivets, and screw-blanks, is supplementary to prior letters patent, granted to this inventor, and bearing date August 20, 1862, No. 2327; the present object being the effectual removal of the blanks from the machine, and the ready adjustment of the feeding apparatus. The dies which hold the rod during the cutting-off operation are both movable, that die which is ordinarily fixed being supported whilst cutting by a strong spring, so that it yields during the cut, but reacts and follows the other cutter a certain distance afterwards, which prevents the buckling of the rod. The holding dies transfer the cut-off piece and present it before the heading die, holding it in position whilst the latter operates, and then they return, and open to receive again the end of the rod. A spring with a *foot*-shaped end is attached to one of the holding dies, and enters a recess in the other. This spring serves to support the cut-off end of the rod during the operation and it ejects the finished blank from the machine when the holding dies open.

Describes the action of a machine adapted for forming the points of nails by the active co-operation of two hammers or forging tools, which alternately strike or press the end of the blank, one being caused to act vertically and the other horizontally by means of an eccentric, the clipping ring whereof carries two arms, one of which is toggle jointed.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1864, October 4.—N° 2439.

DAVIES, Edward.—(*Provisional protection only.*)—" This in-" vention relates to a novel and peculiar arrangement of die " holder or 'stock' to be employed in the manufacture of screws " or 'threads,' whereby greater steadiness is given to the 'dies' " during the operation of cutting the threads of screws, bolts, and " similar articles, by which means also the regular diameter of " such bolts or screws may be insured for any required number."

It consists "in the employment and use of a table or 'head " 'stock' having two fixed projections or plates, one at each end; " between and parallel to these plates are two sliding 'stock' or " 'die plates,' in which the 'dies' are placed for cutting the " screws; these said stock plates holding the 'dies' are caused to " advance towards or recede from each other by means of two right " and left hand screws placed one above and the other below the " cutting 'dies,' and supported in the aforesaid fixed projections, " and are actuated by spur gearing. Passing through these sliding " 'stock plates' and placed immediately above the cutting 'dies' " is a fixed screw, having its bearings in the fixed plates at each " end of the table or bed; this screw is supplied with adjustable " lock nuts, which are so regulated (according to the diameter of " screw required) as to meet and stop the advancing stock plates, " thus determining the diameter of the bolts with precision, and " insuring regularity in the diameter when numbers of bolts are " required to be made to one given size."

[Printed, 4*d.* No Drawings.]

A.D. 1864, October 5.—N° 2447.

DAVIES, Edward.—(*Provisional protection only.*)—This invention, relating to machinery for forging and shaping iron, is more particularly applicable to the manufacture of bolts, nuts, rivets, and spindles. The apparatus employed operates by a novel arrangement of a tilt hammer, which swages and is caused to deliver its blows in rapid succession by means of a series of revolving tappets, that severally by turns lift the hammer by coming into contact with its shaft at a point near its fulcrum, the hammer being suddenly brought down after each lift by the reaction of a strong spring, and the strength of blow tempered by the intervention of an adjustable stopping bar. The rapid action of the hammer is intended "to imitate the action of hand striking," in contradistinction to the usual slow movements of the ordinary tilt hammers in use for heavy work.

[Printed, 4*d*. No Drawings.]

A.D. 1864, October 29.—Nº 2679.

DAVIES, John Lacey. — (*A communication from Edward McNally.*)—(*Provisional protection only.*)—This invention consists, by a process of rolling, in shaping and giving to metal substances, such as spindles, skewers, file blanks, and similar articles, a tapering or irregular form. This result is produced on flat articles, such as file blanks, by increasing or diminishing the distance between the axes of the rollers whilst in operation, by means of two paracentric wheels, upon the peripheries of which the two ends of the axis of the bottom roller respectively rest, the two wheels being fixed upon one shaft are caused to move uniformly in concert, the eccentricity of their peripheries causing the lower roller to rise and fall; the deviation from circularity in the wheels representing the desired form of the article under process.

The shaping of round articles such as spindles, round file blanks, and other metal articles requiring their form to be gradually tapered towards one extremity is effected in the following manner:—The bars or articles to be "shaped are secured by clips " to conical wedges, which are actuated by screw shafts which are " retained in position by a cross head and projecting arms secured " to the uprights of the aforesaid pressure rollers. These screw " shafts are caused to revolve by suitable mitre gearing, by which " means the cross head and driving gear are caused gradually to " advance or slide upon the said projecting arm, thereby causing " *the revolving* clips retaining the piece of metal to force it whilst

" revolving between the pressure rollers, thereby pressing, rolling, " or forming it into the shape required."

[Printed, 4*d*. No Drawings.]

A.D. 1864, December 23.—Nº 3187.

HAWKINS, Thomas Pinfold.—(*Provisional protection only.*) —This invention, relating to the manufacture of staples for fencing and other purposes, consists in making such staples with flat chisel points or ends, in order that when driven they might cut their way into the wood without splitting it, which occurs more or less in driving ordinary staples having conical or tapering points.

"In making the chisel-pointed staples two planes inclined to " the axis of the wire or rod of which the staple is made are " formed on the opposite sides of the ends of the said wire or " rod, the said planes meeting in the axis of the wire or rod and " forming the extreme points of the staple, the said points being " as broad or nearly as broad as the wire or rod of which the " staple is made. The chisel-pointed ends of the staple may " be made by forging or otherwise. The chisel-pointed ends of " the staple may either be in the same plane or in parallel " planes."

It is stated that the chisel points adhere to and hold better in the wood than points which are round and tapering.

[Printed, 4*d*. No Drawings.]

A.D. 1864, December 23.—Nº 3188.

HASELTINE, George.—(*A communication from Richard James Dewhurst.*)—The object of this invention is to manufacture, by successive operations in a machine, nut blanks for screw bolts; these are cut from the rod, punched, forged, and discharged by the self-action of the machinery, the operating parts, which are made of tempered steel, being mounted on a strong cast-iron bed plate. The heated bar out of which the nuts are to be made is fed each move a regulated distance into the machine between guide lips on a spring rest, into position to be operated upon by a vertical cutter, which is brought down by a cam towards a stationary cutter fixed to the bed plate. The piece cut off is pushed by a sliding bar into position beneath the punch or die, which descending cuts the central hole in the blank, and drives the pellet through a hole in the fixed steel plate with which the punching die co-operates. The blank is next brought into position to be operated upon by a chamfering die, which shapes the top of the blank, and its sides after its next move are shaped by fixed side swages and two lateral action hammers, operated respectively by the reaction of strong springs. The hammer stocks are provided with india-rubber buffers which prevent the hammers striking the swages when there is no blank between to receive the blow, the cam or tappets causing the hammers to strike four times, each revolution of the cam shaft, upon the sides of the blank, which during the operation is held upon a vibrating stud. Thence the nut blank is moved under a finishing hammer, and finally is pushed through a hole in the bed plate by the succeeding nut.

[Printed, 1*s*. Drawing.]

A.D. 1864, December 23.—Nº 3197. (* *

SAUNDERS, Edward.—(*A communication from Frederick Saunders.*)—" Improvements in affixing armour plates to vessels " and other structures, and in bolts, screws, spikes, and rivets to " be used for these and other purposes." This invention consists in the substitution of screw and other bolts, spikes, and rivets, formed as described, for general fastening purposes, and amongst others the fastening or securing of iron and armour plates to marine and other batteries, ships of war and other vessels, in lieu of the solid metal bolts, spikes, and rivets as hitherto formed and used, which are liable to be either driven through, or shattered or broken by the impact of heavy projectiles. It is proposed to make " the body, shank, or centre part of the bolt, spike, or " rivet of a number of wires, rods, or strands twisted or so placed " together that in transverse section they shall possess the " required tensile strength, and at the same time a considerable " degree of elasticity, and to make the heads and ends or points " solid, by beating and welding, hammering, or compressing the " same.

" Instead of welding or forging the wires to form the head of " the bolt, they may in some cases be spread out and wedges " driven in to spread " them " so as to cause the whole mass to " conform to the tapering hole in the plate, and then to cover, " if necessary, by any suitable kind of metallic or other packing.

[Printed, 10*d*. Drawing.]

1865.

A.D. 1865, January 28.—Nº 257.

FOSTER, WILLIAM.—This invention relates to screw taps, especially applicable for cutting screw threads either by machine or hand, to gas fittings and connections, steam and water pipes. These taps are fitted with four cutting dies, which slide in dovetailed or undercut grooves made longitudinally in the four opposite sides of the tap, all converging or inclining towards the point or end; the backs of the cutting dies in relation to their outer cutting faces are correspondingly inclined, so that although the dies diverge when sliding up the grooves, their cutting faces are constantly parallel with each other and with the axis of the tap. Each of the dies is furnished externally above its cutting face with a projecting nib, that fits into an annular groove internally made round the inside of a collar, which embraces the four dies and thus keeps them in position; in the collar there is a slotted opening inclining in a spiral direction, through which a stud projecting from the body of the tap protrudes. By this means when the collar by the air of handles attached to it is turned, it is caused to move longitudinally on the tap, and carry with it the dies, which converge and diverge according as their position is changed upon the inclines, and when the hole is tapped, the cutters can be withdrawn from the threads they have cut, and set into another hole without stopping the machine.

[Printed, 8*d*. Drawing.]

A.D. 1865, February 2.—Nº 292.

LUNGLEY, CHARLES.—This invention relates to armour plated ships, forts, etc., and to the fastenings employed. It is described by the inventor as follows:—

"I use as backing to the protecting plating bars of iron, which
" may be rolled or forged of dimensions sufficient to be punched
" or drilled through for fastening with bolts to the frame or back-
" ing of the ships, forts, or other structures. The bars may then
" be filled in with wood, or such other suitable substance for
" ships or forts as may be found desirable, and in the case of
" forts I make the frames and stays of this or similar description
" of bars so as to be strong enough to admit much larger fasten-

" ings than heretofore. The object of this plan is to enable the " fastenings to be equal to the thickness and strength of the pro- " tecting armour parts. The connection in this manner will " enable the bars to be fastened edgeways, although they may be " wider or deeper, and they may also be rolled or forged thicker " where fastenings go through them, so that they may be drilled " if thought advisable. I also make the bars in two or more " parts, so that they may be secured together by rivets or bolts, " clasping studs or fastenings in ships or forts. The iron may " be rolled thinner in the middle, so as to make it as light as " possible; this iron I propose to apply to strengthening such " parts of the fortifications as may require it, such as diagonal, " vertical, or longitudinal ribs and stays, and also to gun " carriages."

The fastenings employed to secure armour plates are in the form of bolts, with a conical head at one end, and screw-threaded to carry a nut at the other. These bolts are hollow, having a hole or passage completely through them to receive a smaller bolt, which is employed for fastening the external covering or sheathing. In some cases the hollow bolts are upset or opened out at the inner end, the hole in the plate behind the backing being countersunk, and sometimes the bolt is screw-threaded, and double nuts are used. Bolts slotted transversely to receive a key shouldered to prevent its dropping out when struck, are also employed. In the construction of forts the inner ends of the hollow bolts are clinched or expanded, so as to fit a countersunk recess in the inner plate.

Bolts for driving into the timber backing of ships and forts have a conical head and short point, whence springs one or two spiral threads, which run about one-third up the length of the bolt. These bolts may be either solid or hollow at the upper end; the heads are conical.

[Printed, 10*d*. Drawings.]

A.D. 1865, February 4.—N° 318.

RICHARDSON, Robert.—This invention relates to "railway " chairs, fastenings, and sleepers," and consists, with regard to chairs, in casting the jaws which receive the rail diagonal on the base plate, thereby obtaining increased bearing surface, diminished weight, and corresponding economy.

Railway sleepers, either longitudinal or transverse, are cast of iron plain on one surface, and cellular or honey-combed on the opposite side. The cells for the purpose of increasing weight are filled with a kind of concrete, preferably made of lime, sand, and tar. Other plans and designs for cast-iron rails are exhibited and described.

Railway spikes are made in two parts, one part acting when driven alongside, as a longitudinal key to the other part, the part of the head on the contiguous side of each part being removed, leaving a plain surface on each to bed together. These and ordinary spikes or treenails are to be driven obliquely either on one or both sides of the rail, in a direction pointing downwards from the top of the rail, the wedge part or key being outside. A corrugated double spike is shown in the drawing but not described.

[Printed, 10*d*. Drawings.]

A.D. 1865, February 13.—Nº 400.

KENNARD, Henry Martyn.—(*Provisional protection only.*)—This invention relates to machinery adapted for rivetting and making rivets. The machine comprises "a strong framing . . . . " with two uprights, situated such a distance apart that the " object to be rivetted can pass between them. In these uprights " there are arranged two sliding rams or pistons, the one situated " opposite the other, and each carrying a die or cup for forming " the rivet heads, so that when the object to be rivetted is passed " between the two uprights (being held and guided in its motion " by guide rollers) and a length of heated rivet iron has been " inserted into the hole formed in the object to receive it, both " pistons or rams with the dies are caused to advance, and by acting " simultaneously upon each end of the rivet iron are made to " form both heads of the rivet at once." The requisite motion is imparted to the rams through levers connected with a toggle joint, by a crank or eccentric on the main shaft, the power passing through a lever, the fulcrum of which is counterbalanced, and capable of yielding to any unusual strain.

When employed for rivet making, a compound die holder is mounted to revolve intermittently on a horizontal stationary shaft, and is interposed between the rams; in each part or opposite surface of the die holder is circumposed a series of holes answering for dies, and the two parts enclose between them fixed on the shaft a disc or cam of varying thickness, having on each side an inclining surface for the purpose, by acting on the ends of the rivets, of pushing them out of the dies. The requisite motion is imparted to the compound die holder by a ratchet, and as the rivet lengths of heated bar iron are fed into the dies respectively on both surfaces of the die holder, they are by the rotating movements of the latter brought directly opposite the heading rams, and during its subsequent movements the intervening cam disc gradually pushes the finished rivets out of the die holes, which are constantly in succession supplied with fresh rivet pieces before they again come opposite the rams.

[Printed, 4*d.* No Drawings.]

A.D. 1865, February 28.—N° 565.

WEIGMANN, George.—(*A communication from Robert Kunstmann.*)—(*Provisional protection only.*)

According to this invention, which relates to dies for cutting screws, "it is proposed to make the passage through the die " conical, and to form three or more projecting sharp-edged ribs " therein, the edge of each rib having a number of sharp-pointed " cutting teeth or serrations made thereon, of a pitch corresponding " to the pitch of the screw thread to be cut. The teeth at the " entering or wider side of the die are shorter and stronger than " those at the opposite or smaller side, and serve to remove the " outer skin of the metal and make the first or preparatory cut, " but as the rod or blank is screwed inwards the teeth gradually " cut deeper and deeper, until by the time the blank has passed " through the die the full depth of thread is cut, thus dispensing " with the tedious operation of passing the blank through three " or more separate dies. As the teeth act solely as absolute cutters a better thread is obtained than by the present dies, wherein " the thread is partly formed by compression of the metal. If " desired this die may be made in two or more parts.

[Printed, 4*d.* No Drawings.]

A.D. 1865, March 1.—N° 575.

BAYLISS, Moses.—(*Provisional protection only.*)—This invention relates to a machine which by a process of rolling is adapted " for pointing or drawing down railway spikes, ... and is " also applicable for forming or drawing down the shanks of " ordinary spikes and other articles of irregular shape." It is proposed to effect these results " by two eccentric rolls, geared

" together, so that their expanding and contracting surfaces shall " simultaneously operate on the iron intended to be drawn out " by this process; and I also use lateral or side rolls, that work " by contact with the vertical rolls, and the iron which is being " reduced. The principal feature of novelty consists in advancing and retiring the two side rolls to and from their work so as " to relieve or remove their pressure, thereby permitting a momentum power to be acquired by the revolution of a fly-wheel " . . . . . . as soon as the pinch consequent on the pressing or " drawing out of the metal is passed, which may not occupy " above one-eight of the revolution of the rolls."

[Printed, 4*d*. No Drawings.]

A.D. 1865, March 8.—N° 644. (* *)

WADSWORTH, Joseph, and WADSWORTH, James.—(*Provisional protection only.*)—Machinery for making "nails, sprigs, " spikes, or pins, &c." "This invention consists in the employment of a revolving shaper working in connection with a " stationary shaper. The revolving shaper is placed on the end " of a shaft working in suitable bearings, and the stationary " shaper is placed concentric or eccentric with the revolving " shaper, the position depending upon the shape of the article to " be manufactured; in all cases a sufficient space being left " between the shapers at the entrance to allow the metal to pass in " between them." When pins, nails, and sprigs are to be made, the stationary shaper is placed eccentrically with the circular shaper, and on both are formed "longitudinal corrugations or " teeth for the purpose of causing the metal to revolve and carry " it forward as it is being reduced in thickness or diameter, and " when a head is to be formed," corresponding circular recesses are made in each shaper. "The prominent edge of the revolving " shaper works nearly close to the prominent edge of the termination of the stationary shaper for the purpose of reducing the " article to a point and cutting it off." Another method consists in the employment of "two circular shapers formed with recesses " or prominences on their peripheries according to the article to " be made," which revolve in the same direction and are moved to and fro from each other by eccentrics or otherwise. Instead of circular shapers the inventors claim also the use of rectilinear shapers.

[Printed, 4*d*. No Drawings.]

A.D. 1865, March 21.—N° 785.

FARMER, CHARLES, and TURNER, THOMAS.—This is an invention of machinery adapted to the manufacture of nails, escutcheon pins, and shoe and other rivets. The wire or rods out of which the nails, &c. are to be made may be delivered in uniform lengths to the adjustable feed motion from a reel or otherwise, " after which it is seized by a compound grip motion, which not " only performs the operation of cording, beading, grooving, or " worming the shank of such nails, when required, but also " securely holds the wire or rod that is being used during the " time the header is performing its work, and which head may be " diversified according to the die fixed or impressed in the " header, or the description of nail, pin, or rivet required to be " made. At this stage the nail or rivet may be considered formed, " with the exception of cutting off and pointing, and for this " purpose the grip motion is relieved and the feed motion brought " into action, which advances the nail or rivet partly formed, " according to the setting of the feed motion, when two or more " central dies advance to separate or cut off and then point the " nail (when nails are being made), which drop into a spout to be " carried off into a pan for receiving them. By this time the " grip motion has again laid hold of the wire for the heading " motion to follow up in succession to continue the manufacture, " which we have found may be easily done (without any injurious " effect to the machine, at the rate of about two hundred revo- " lutions per minute, more or less, as may be preferred, a nail or " rivet being formed at each revolution of the driving shaft. But " for the manufacture of the larger description of nails as well as " the sort designated counter clout nails, we purpose working the " machine in close proximity with a hot-air furnace, or muffle, or " other equivalent means, so that the metal may be drawn in a " heated state from the muffle into the machine to be worked " into nails, in which case we employ cold water to flow on the " working dies to keep them cool."

[Printed, 1*s*. Drawings.]

A.D. 1865, March 24.—N° 835.

GREEN, JOSEPH.—This invention relates to a machine adapted for chasing and cutting the threads on screws. It consists in mounting upon a lathe bed a sliding carriage, whereon are fixed the fast and loose headstocks. The spindle of the fast headstock has fixed upon it at the back end a spur wheel which, through an intermediate wheel engages with a longitudinally grooved barrel or broad pinion, and the spindle also carries between its bearings a long sleeve, on one half the length of which is cut a right-handed, and on the other half a left-handed screw thread, for the purpose, by means of half nuts fixed on short arms carried by a rocking shaft, of causing the carriage to slide either in one or the opposite direction. The tool holder is mounted on an adjustable slide attached to the lathe bed, and connected by an adjustable lever to the rocking shaft, which can be turned either by a hand or a foot lever, whereby the screwing or chasing tool is brought into or moved out of working contact with the screw or article in process, at the same time and by the same movement of the rocking shaft which brings the half nuts respectively into gear with the right or left-handed screw threads on the sleeve of the lathe spindle, thereby causing the reversal of the longitudinal motion of the carriage and headstocks, the revolving spindle, and the screw or article travelling therewith, the tool holder and chasing tool being stationary during the operation. Every change of pitch requires a change of sleeve and half nuts to correspond.

[Printed, 10*d*. Drawing.]

A.D. 1865, March 29.—N° 886.

ROBINSON, Richard Cardwell.—This invention relates to machinery for "cutting . . . . . . nails, brads, or spikes, and to "the conformation of such nails and spikes." The machine employed operates by means of a revolving cutter holder, which is mounted on a strong transverse shaft carrying spur gearing, with which a pinion on the driving shaft engages; two top cutters or sets of cutters are fixed respectively to project radially from the opposite sides of the cutter holder, so that the two cutters or sets as the holder revolves act alternately, each cutter or set being differently formed for cutting the opposite sides of the nails. The plate is presented to the cutters in a direct line at right angles to the axis of the cutter holder, and is advanced by feeding rollers, which are actuated twice every revolution of the cutter holder, by a pawl and ratchet wheel, so that the plate is projected forward the width of a nail previous to every cut. The bottom cutters, which co-operate respectively with the cutters in the holder, are fixed to a transverse sliding frame, which by means of a lever obtains its motion from a cam. The two bottom cutters or sets of cutters on the sliding frame, respectively correspond in shape and inclination with the revolving top cutters, and by the motion of the sliding frame, they are brought alternately into cooperative position beneath the end of the plate. The nails and articles are cut head and point alternately by the two cutters or sets, transversely from the end of the plate, and the configuration of the different kind of nails is such that the extra metal required to form the head and thick part of the shank of one nail is supplied by the tapering shank and point of the next.

A variety of these nails suitable for different purposes are exhibited in the drawing, and amongst them there is one which has a curved projection on one side of the shank; this is for the purpose of turning out, so as to give a lateral direction to the point of a key nail, which is to be driven down beside it.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1865, April 7.—N° 992.

WILKES, THOMAS.—This invention, relating to machinery for manufacturing railway bolts, spikes, and other similar articles; refers more particularly to the dies and tools by which the heading of the bolt or spike is effected. The heading tool described consists of two parts, one tubular or external part, the opening in which at the lower end is enlarged to mould the sides of the head; this constitutes the moulding die, which acts in conjunction with an internal plunger, that shapes the top of the bolt head, and by compression causes the metal to spread laterally into the remote corners or angles of the moulding die. The sides of the recess in the moulding die are parallel, and the recess is made double the usual depth to accommodate the internal plunger, which is capable of sliding up and down, and is fixed to a rod which passes up through the tubular opening, and projects from the upper end.

When in operation, the end of the heated rod is brought directly under, so as to enter the moulding die when it descends, and by the joint action of the two parts the end of the bolt is moulded to the required form; the moulding die containing the bolt head and plunger then rises until the plunger is stopped by the top end of the rod coming into contact with a cross piece, whereby during the further rising of the moulding die the bolt head is forced out of the mould. The thickness of the bolt head is regulated by a packing of more or less washers, interposed between the inverted bottom of the mould and the top of the plunger head, and the latter is kept up in position by a helical spring.

The apparatus is applicable to machines in general use.

[Printed, 8*d*. Drawing.]

A.D. 1865, April 7.—N° 994.

BROWN, James.—This invention relates to the making of nails of a special form, chiefly intended for securing metal plates or pieces to articles of a like material, the nails being of steel or of metal harder than the metal into which they are driven. According to the drawing these nails have flat round heads, and the shanks are short and thick, and triangular in transverse section, somewhat tapering, and terminating suddenly in a kind of triangular pyramidal point. These triangular nails "require a " circular or oval aperture to be made in the metal plates or articles " into which they are to be driven."

[Printed, 6*d*. Drawing.]

A.D. 1865, May 4.—N° 1245.

STANLEY, William Ford.—This invention relates to " straight " line dividing engines and tools for regulating distances," applicable amongst other things to lathes for cutting screw threads and adapted to a variety of similar and other purposes. It consists,—

1st. " In placing the " dividing " screw upon an axis, so that " it may work obliquely between the bed instead of working " parallel with the bed, or what would be the same mechanical " equivalent, centring the bed to move to any degree of obliquity " or angle to the screw." This oblique acting screw for dividing or regulating distances is applicable to lathes employed for cutting the threads of screws and similar purposes.

2nd. Relates to the means employed for rendering the self-action of dividing engines continuous. This is accomplished " by " the employment of a ratchet wheel to give motion to the screw, " the teeth of which being equally divided and cut, take the " place of a divided disc or its equivalent in the ordinary engine."

3rd. Consists by "self-acting means of regulating the lengths "of the lines or readings . . . . . of the divisions upon "scales."

[Printed, 8*d*. Drawing.]

A.D. 1865, May 11.—N° 1311.

MOUNTFORD, George, and WORROLL, Edward.—This invention relates to "apparatus for cutting, turning, and smoothing metal pipes, and the surfaces of bolts, rods, or spindles." The apparatus employed resembles a pair of hand screwing stocks, furnished with a pair of dies and a cutter, which co-operates with the dies, and is advanced independently by a screw. The pipe, bar, or bolt, is passed through the stocks between the dies, and held in a fixed position whilst the stock, in the usual way of cutting screws, is worked round by means of the handles; the dies being made to cut or not, as in the case of severing pipes, when the dies are merely used to support the opposite side of the pipe, against the pressure of the cutter. The stocks may be made to accommodate two pairs of dies to co-operate with two cutters, and they may be employed for cutting screw threads, the cutters acting first as chasing tools doing the rough part of the work, and the dies following and finishing the operation.

[Printed, 8*d*. Drawing.]

A.D. 1865, May 16.—N° 1357.

LEDDICOAT, Richard.—This invention, relating to the manufacture of rivets, bolts, spikes, and similar articles, consists of a machine wherein are combined two separate sets of operating apparatus, actuated by one central main cam shaft. Each set comprises a circular die holder intermittently revolving on a horizontal axis, and carrying a circumposed series of eight dies, co-operating by turns with a heading die, and afterwards with a clearing punch. The ends of the rods of rivet or bolt iron taken direct from the furnace are presented in succession to the several dies in the die holders, through guiding holes in a fixed cutter, by grooved feeding rollers, the two pairs, respectively at the opposite sides of the machine, being actuated alternately by friction levers connected to a reciprocating slide frame, which embraces an eccentric cam on the cam shaft. The ends of the bars pass directly into and through the dies then opposite the *feeding holes*, a portion sufficient to form a bolt or rivet head, projecting out of the dies at the back of the die holders. The pieces thus entering the dies are severed from the rod by the edge of the dies severally at the succeeding divisional move of the die holders, and are brought by turns directly opposite the heading dies. These dies are fitted into plungers which slide in guides, and are fixed lineally projecting from the opposite ends of a reciprocating frame, which embraces and is actuated by another cam on the cam shaft. These plungers and heading dies co-operate one with each die holder, operating alternately therewith at the opposite sides of the machine, the intermittent movements of the die holders respectively bringing round into coincident position every onward move, fresh pieces in the dies, which after the heading process are, at another stopping interval of the die holders in succession forced out of the dies by the clearing punch.

[Printed, 10*d*. Drawing.]

A.D. 1865, May 19.—N° 1387.

NEWTON, Alfred Vincent.—(*A communication from Jarad Augustus Ayres.*)—This invention, relating to screws and screw-drivers, "is designed to obviate the tendency of the screw-" driver to slip or draw out from the slot or nick in the head " of the screw in turning the same and to hold the screw on " the screwdriver in such a manner that the screw may be " entered directly into the wood without the application of the " hand" of the operator "to the screw, thus greatly facilitating " the driving or turning in of screws in cases where it is " difficult to hold them while being entered into the wood." The screwdriver and the shank or holder, which fits into the wood handle, are two separate parts, the former being a short piece of steel or other kind of metal fitting into the end of the shank which is tubular and slit longitudinally, the two parts being made to grip the driver by means of a screw. Both ends of the driver are fashioned for use, one in the ordinary way for general purposes and the other in accordance with the invention, which consists in longitudinally slitting the extreme end and slightly bending the two parts out of line with each other, and then so under cutting the projecting sides as to form a rib across the end of each part and bring the two extreme ends in a line. The neck of the screw is slightly dovetailed, into which the end of the driver is inserted before it is placed in the shank and fixed by the gripping screw, which by closing the slit ends of the shank so presses upon the two bent ends of the driver as to spring back and to fix them in the dovetail of the screw head. When the screw is driven the driver is set free by relaxing the gripping screw.

[Printed, 6*d*. Drawing.]

A.D. 1865, May 23.—N° 1411.

McNALLY, Edward.—This is an invention for cutting screw threads either right or left-handed, applicable to lathes and to handstocks, and also adaptable to severing pipes and tubes. It consists of a cutter, that acts as a chasing tool having two cutting edges, which operate at a more acute angle than ordinary dies, one edge coming into operation for cutting when the screw is turning in one direction and the other edge when the direction of its motion is reversed. As adapted to handstocks the cutter is placed in the die box in a radial recess, the form of which gradually contracts towards the outer end, which terminates in a circular enlargement, wherein the outer end of the cutter is fitted with limited liberty to move in the recess as on a centre (after the manner of a ball and socket joint), across the radial line. The inner end of the cutter is concave and the two angles formed by the sides are the cutting points, which respectively come into action according to the direction of motion, the body of the cutter being supported when cutting either by one or other side of the recess, and adjustable blocks fitted to slide radially in the die box at the opposite side supporting the screw. For severing pipes a single pointed cutter is employed.

[Printed, 8*d*. Drawing.]

A.D. 1865, May 29.—N° 1473.

PAGET, Frederick Arthur.—This invention relates to the locking of screws and nuts, also to the prevention of unequal strain upon the screw threads if the planes of the surfaces vary. These results are to be obtained by the use of a steel washer made hollow on the under side, so that by the screwing down of the nut or screw the washer is brought into a state of initial strain. Sometimes the steel washer is concentrically corrugated, or formed of dished steel plates with some kind of elastic material *interposed*. In some cases the surfaces respectively of the washer and nut are serrated or a spring is embedded in a groove turned in the under surface of the nut or screw head for the purpose of interlocking with the serrations on the washer. The washer follows up the nut, and jarring or vibration will not move it back; it will hold if the planes of the surfaces respectively coming into contact vary and the difficulties with jamb nuts are obviated.

[Printed, 8*d*. Drawing.]

A.D. 1865, June 3.—N° 1527.

TAYLOR, Charles.—This invention relates to tube cutters and screw-stocks and dies. The tube cutter is a kind of single handled stock provided with an angular claw, which at two points supports the pipe against the pressure of a circular cutting tool which is carried in the end of a sliding piece and worked up by a screw. By moving the tube cutter round the tube as a centre by means of the handle, and gradually advancing the cutting tool by means of the screw, the tube is transversely cut and divided.

Each die of a pair adapted for screw stocks is made in two parts which, when placed in the stocks, are locked or kept in position relatively by the sides of a round steady pin which lays between them; the sides of the stocks are cut to suitable angles for holding the dies, which are correspondingly formed at the sides with angular recesses and forced up when cutting by a screw. These screw stocks may be adapted for tube cutting by substituting, in lieu of the screwing dies, dies with a single cutting edge.

[Printed, 1*s*. Drawings.]

A.D. 1865, June 5.—N° 1531.

DE BERGUE, Charles.—This invention, relating to the manufacture of rivets, has reference to a machine adapted for trimming and finishing the heads of rivets by means of tubular or annular punches and dies, which take off the fins or burrs and irregular edges at the base of the head. The machine is also capable of making rivets, and has two sets of operating apparatus, which may simultaneously be engaged, respectively at opposite sides of the machine, one set in making rivets, and the other set in trimming and finishing, appropriate moulding and shaping dies being substituted in place of one set of the annular punches and dies. The two sets of apparatus are fitted, one at each end of a horizontal slide, which at its midlength contains a transverse open slot or guide, wherein a sliding block carried by a crank pin on the end of the main shaft, slides up and down, and as the shaft revolves gives the requisite reciprocating movement to the slide. Fixed in projecting parts of the frame respectively directly opposite the ends of the slide, are, at one side of the machine for rivet making, the heading mould or die, and at the opposite side, the stationary trimming die for finishing them; and fitted in the corresponding ends of the slide, in position to co-operate respectively therewith, are the rivet holder and the trimming punch. A cutter with four cutting edges is fixed to the slide and reciprocates therewith, for the purpose in co-operation with a fixed cutter, of severing from the heated rod the rivet pieces, which fall into a slanting trough and are thence supplied to the machine by hand.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1865, June 23.—N° 1686.

FINCH, Edward.—This invention relates to the construction of machinery adapted for making rivets, bolts, spikes and similar articles. The machine consists of an upright standard, having arranged on one side to move up and down in a vertical guide, a slide carrying a cutter, which co-operates with a cutter fixed to the standard for cutting in regulated lengths the rivets or bolt pieces from the bars which, by means of a pair of feeding rollers, are drawn from the heating furnace and presented to the shears. The lengths cut off the heated rod are, by a boy or otherwise, carried to a heading apparatus, disposed in a slanting position at the opposite side of the machine; this apparatus comprises a fixed die appropriately recessed to form the rivet or bolt head, and a hollow reciprocating slide, containing a bush to receive the rivet pieces and an adjustable plunger, which when set determines the length of the rivet or bolt shank. By means of eccentrics on the main shaft, the slide is forced up to the die, and the end of the rivet piece which projects from the bush, enters the recess and the head is formed. When the slide retires with the finished rivet, the internal plunger is detained by a catch, and by this means the rivet is forced out of the bush.

Describes and exhibits plans of a furnace adapted for heating the bolt-iron rods.

[Printed, 2*s*. 10*d*. Drawings.]

A.D. 1865, June 24.—N° 1693. (* *)

FONTAINE MOREAU, Peter Armand Le Comte de.—(*A communication from Bernard Courvoisier, Maxime Antoine Ducis, and François Bigoy.*)—" Certain improvements in machinery for " the manufacture of horse-shoe and other nails."

The inventor employs, in manufacturing nails, revolving cylinders, between which are placed iron bars from which the nails are produced. On the periphery of each cylinder recesses are cut, forming the dies which give shape and dimensions to the nails, and each nail as it is formed, separates and falls out of the cylinder. The cylinders are put in motion like other rolling machines, and revolve in opposite directions. What is claimed is the formation of nails by means of rollers or revolving cylinders, in which are cut the shape and dimensions of the nails to be manufactured.

[Printed, 8*d*. Drawing.]

A.D. 1865, June 27.—N° 1709.

KENNARD, Henry Martyn.—This invention relates to machines adapted for rivetting together metal plates, a head on each end of the rivet piece being formed simultaneously at one operation by the machine, which is also capable by the introduction of a revolving die holder, of making rivets when not otherwise employed. As arranged for rivetting, the machine operates simultaneously on the opposite sides of the plates which are under process of being rivetted together, by means of two heading dies or cup faced rams, which slide lineally in horizontal guides, and are caused to approach each other in a direct line, and press respectively on the ends of the short piece of heated iron (which has been previously placed in the hole through the two plates), by two levers, which obtain the requisite movement through two short connecting rods toggle jointed to a link, which is operated by a crank on the main shaft through a lever, the fulcrum of which is counterbalanced and capable of yielding to any unusual resisting strain.

When the machine is adjusted for rivet making, an intermittently revolving disc or die holder, which is furnished on both sides respectively opposite with a circumposed series of dies, is so mounted on a hollow horizontal shaft and interposed between the ram slides, that each successive movement of the disc, brings by turns two of the opposite dies directly between the two rams, which are furnished with heading punches, the finished rivets being afterwards as the disc revolves forced out of the dies by an internal stationary cam, which is mounted on a fixed spindle, whereon the hollow shaft which carries the die holder revolves.

Describes a modification of the double heading rivetting machine, wherein the opposing rivetting punches are carried by slides moved lineally by levers having their yielding fulcra supported by strong springs.

Also a double heading rivetting machine capable, by means of jaws which carry the heading tools, of operating in positions unaccessible to ordinary machines.

[Printed, 1*s.* 6*d.* Drawings.]

A.D. 1865, July 7.—N° 1796.

WALDENSTRŎM, Eric Hugo.—This is an invention of machinery or apparatus adapted to the manufacture of bolts, rivets, and spikes, and operating by means of an intermittently revolving disc or horizontal table, which rotates at intervals on an axis fixed vertically in the base plate of the machine. The upper face of the disc is furnished with a series of die holders, circumposed relatively at corresponding radial and segmental distances, These holders carry the bottom dies, wherein the short lengths of heated iron to be made into bolts and such like articles are vertically inserted, and are in succession, as the disc intermittently revolves, by turns brought directly under, first, a compressing tool. which fairly forces the metal pieces into the dies; at the next move of the disc they come by turns under a compound heading tool, which comprises a moulding die and an internal punch respectively actuated, the first by cams, and the punch by an eccentric. The moulding die descends first, and encloses the end of the bolt piece, which projects upwards from the under die, and then the internal punch comes down upon the top of the bolt piece, and spreads the metal into the remote corners of the mould, shaping at the same time the top of the head to the required form. After operating, the moulding die first rises clear of the bolt head, and then both rise into position for operating on the next bolt piece, and so in rotation as the heated metal pieces are brought round in the bottom dies of the disc. After the *heading process,* the finished bolts are by turns forced upwards out of the bottom dies by means of a pusher, which lifts a plug piece contained in each of the sockets that hold the bottom dies.

[Printed, 1*s*. 8*d*. Drawings.]

A.D. 1865, July 19.—N° 1887. (* *)

INCE, THOMAS HENRY.—"Improvements in shoeing horses."

In this invention screws are used instead of nails. The shoe is drilled for the reception of the screws and the holes are countersunk to receive the heads of the screws. Holes are drilled in the horn of the hoof to correspond with those drilled in the shoe. They are drilled parallel with the outer surface of the hoof, and of the same diameter as the shafts of the screws, so that the crust of the hoof may neither be forced outwards or inwards, as would be the case if the holes were smaller in diameter. The screws have threads or worms of considerable depth as compared with the diameter of their shafts. The shafts of the screws may be tapered, but it is preferred that they should be cylindrical. It is desirable that the diameter of the thread of the screw should be less at the point than at the head. In some cases the surfaces or the heads of the screws, in place of being at right angles to the central line of the shafts, are inclined thereto, so that when the screws have been screwed into the foot, their heads may come more nearly parallel with the under surfaces of the feet.

[Printed, 6*d*. Drawing.]

A.D. 1865, July 27.—N° 1949.

NEWTON, WILLIAM EDWARD.—(*A communication from William Sellers and Coleman Sellers.*)—The object of this invention, which relates to a machine or apparatus for threading or cutting screws, is to be capable, by means of a hand lever whilst the machine mandril and die clutch are revolving, and the cutting dies are either operating upon the screw or otherwise, of so relaxing or increasing the severity of cut by the convergence or divergence of the dies, that the thread may be gradually eased off, and brought to the extremity of a bolt having a tapering end, or if required, a thread may be cut on a bolt of varying diameter, the radial movements of the dies being entirely under the control of the workman, and in no way connected with the motive power. The dies are fitted into radial grooves formed in a circular chuck or die box mounted on the front end of the machine mandril, which is tubular, and carries the driving pulley on its after end.

Several modifications or contrivances are described for the opening, closing, or adjusting the dies by the movement of the handle whilst the mandril and die chuck are revolving. In one modification the result is effected by eccentric curves in a cam-box, in another by a longitudinal movement of a sleeve on the mandril, and a third employs an epicyclic train of bevel wheels in combination with the other parts.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1865, August 9.—Nº 2060.

HARVEY, George, and HARVEY, Alexander, junior.— This is an invention of machinery adapted for screw-threading bolts and tapping nuts. Suitably mounted on a horizontal frame or bed is a headstock, carrying in appropriate bearings a hollow mandril, fixed on the back end of which there is a spur wheel, that obtains motion by engaging with a pinion fixed on a back shaft whereon is the driving pulley. The front end of the mandril carries a die chuck or circular box fitted with three radial grooves, in which the dies are severally caused to slide to and from the centre by means of screwed spindles, each spindle having fixed upon its outer end a bevel pinion engaging at opposite sides with two bevel-toothed rings, which are fitted to slide round in the circular die box. "Enclosing the pinions and rings there is a " hollow ring which does not revolve, but is carried by two rods " working in sockets in the framing, and capable of being moved " horizontally by a lever. The inner vertical faces of the hollow " ring are made to act as clutches upon the bevel-toothed rings, " and when the lever is moved over to either side, it makes the " hollow clutch ring bear on one of the bevel-toothed rings, and " prevent it from being carried round. The holding of one ring " in this way causes the screw spindles to turn in one direction " and screw the die inwards; and the holding of the other ring " causes the screw spindles to turn in the other direction, and " screw the dies outwards." The bolt to be screwed is presented to the dies by a pair of grippers mounted in a following headstock, and the bolt as the thread is cut upon it enters the hollow mandril.

When preparation is made for tapping nuts, holding pieces which grip the shank of the tap, are substituted in place of the threading dies, and the nuts are held and presented to the tap by the grippers in the following headstock.

[Printed, 10*d*. Drawing.]

A.D. 1865, August 15.—N° 2104.

McDERMOTT, John William.—(*Provisional protection only.*) —This invention relates to a machine adapted for heading bolts. The principal operating parts of the machine consists of two wheels, mounted on horizontal axes relatively in parallel position. Projecting radially at divisional distances from the periphery of one wheel is a series of arms with sockets for holding the heated bolt pieces, and mounted on the periphery of the other wheel is a corresponding series of dies. The axis of one of these wheels rests in bearings fixed to the frame, but the axis of the other wheel is carried by a horizontal reciprocating sliding frame. By means of gearing and other suitable appliances the wheels are caused to revolve intermittently, moving on and stopping simultaneously the holding sockets which carry the bolts on one wheel, and the dies on the other wheel severally stopping in succession in opposition, on the plane of the axes of the two wheels. By the advance of the sliding frame, the dies on the die wheel are brought into contact with the end of the bolt piece presented by the opposing socket of the other wheel, and in this way as the dies and sockets respectively come round the heads are formed in succession upon the heated bolt pieces, which after the heading operation are forced from the sockets by a part of the apparatus. The dies and sockets are cooled by dipping, as the wheels revolve, into troughs containing cold water.

[Printed, 1*s*. Drawings.]

A.D. 1865, August 18.—N° 2133.

LAWRENCE, Phineas.—(*A communication from Jacob Nichols and Moses Pettes.*)—This invention relates to the manufacture of a short kind of stud, to be used in the manufacture of boots and shoes for the purpose of relieving the leather, or other external soles and heels, from the ordinary wear, after the manner of shoe nails, excepting that they are inserted into the material which forms the external sole or heel through from the upper side, the length of the studs corresponding with the thickness of the material, so that the ends are flush with the surface on both sides, or they may project externally, being inserted in rows, quincunx, or arranged in the soles in any other form. The upper ends of these studs generally have the form of a wood-screw head, which is hidden between the inner and the outer sole, and which prevents the studs coming through. Some have the shape of a conical frustum, and in the drawing a variety of studs in modified forms, square, round, and polygonal are exhibited.

[Printed, 8*d*. Drawing.]

A.D. 1865, August 31.—N° 2240.

CARRON, WILLIAM.—(*Provisional protection only.*)—This invention relates to a mode of threading screws, and is more particularly applicable to the manufacture of wood-screws. The screw-blanks are prepared in the usual way, that part of the stem which carries the thread being reduced in diameter to receive a thread, which is separately made and fixed on afterwards. The threads are made by helically winding thin strips of metal round a rod or mandril, somewhat less in diameter than the screw end of the shank, in order that it may fit tight to the shank when placed thereon. When the threads are placed upon the shanks, the latter are dipped into a bath of melted tin or zinc, after the manner of galvanizing articles, and by this means the threads become firmly fixed to the blanks. Other devices may be resorted to for fixing the threads, but the galvanizing process is preferred.

[Printed, 4*d*. No Drawings.]

A.D. 1865, September 14.—N° 2353.

LEWIS, JOHN.—(*Provisional protection only.*)—The object of this invention is the making round shouldered rivets, spikes, screw-blanks, bolts and nuts, by a machine, similar in its general arrangements to a machine described by this inventor in his specification of a prior patented invention, dated July 13, 1864, No. 1746, excepting that the horizontal motion therein claimed is not required. It is described as follows :—" I use a self-acting feed " motion from a regulating disc plate lever and connecting rod, " I use a similar headstock and lever to the before-mentioned " patent with the vertical slide blocks, but the bottom block " instead of remaining stationary . . . . . is made to slide up, " following the action of the upper die block by means of a volute " or other spring or a lever motion. I obtain by this motion the " displacement of the rivet or other object, by bringing it up to " *the front of* the cutter plate, through which the bar is fed, and

" by which bar it is driven out by the next feed. For counter-
" sunk or round small heads I use a solid die block and solid
" dies, in the face of which is a guide; for the heading tool I use
" a self-acting feed motion and rolls, acted upon by a regulating
" disc plate, lever, and connecting rod."

When the machine is adapted for making nuts it is fed by hand, the nut pieces being cut lengthway of the grain from suitable bars; the feeding motion is removed, two half dies are fixed in the sliding blocks, and in the place of the heading tool there is a pointed perforating tool that makes the central hole by displacing the metal, which is forced out laterally and made to form a portion of the body of the nut, the latter being held between top and bottom dies whilst the tool operates.

[Printed, 4*d*. No Drawings.]

A.D. 1865, September 14.—Nº 2355.

WAKEFIELD, John.—The object of this invention, which relates to the manufacture of iron, copper, or other metal rivets, is to secure simplicity in the constructional arrangements, and efficiency of action in the machines employed. The metal rod out of which the rivets are to be made, either in a hot or cold state is fed a regulated length into the machine, either by hand or by an ordinary feeding apparatus, through a guide cutter plate directly into a pair of movable gripping dies which act conjointly with the cutter plate, and by a downward movement sever the rivet pieces from the rod and carry them down into position opposite a shaping die carried in the end of a horizontal plunger. That portion of the cut-off piece which projects from the front of the movable gripping dies is intended to form the shank, and when the plunger advances its projecting end enters the shaping die, which moulds it to the required form. The plunger then retires, and with it the half-formed rivet, which remains in the shaping die. The gripping dies then rise, so as to bring a hemispherical recess or head mould formed in the face of the bottom gripper die, opposite the shaping die, which then advances and forces the end of the rivet piece into the heading mould. When the plunger retires the finished rivet is forced from the shaping die by an internal bolt, whilst a fresh piece is fed into the gripping dies, which are then in a position to receive it.

[Printed, 10*d*. Drawing.]

A.D. 1865, September 16.—N° 2371.

JOHNSON, John Henry.—(*A communication from Robert Heapey Butcher.*)—This invention of apparatus for shaping metal articles is described as applicable to shaping and finishing the heads of bolts, and to the heading of bolts. For shaping and finishing bolt heads, "it is proposed to employ two or more hori-"zontal compressing and shaping dies, which are caused to "advance upon the work by the action of cranks, eccentrics, or "cams carried on separate shafts which are geared together, and "are all driven from one main driving shaft. In conjunction "with the horizontal dies above referred to there is a vertical die "which exerts a downward pressure upon the heated metal "blank; all these dies are made adjustable in their slides by "adjusting screws, so as to enable heads of various sizes to be "shaped, and by varying the forms of the dies it is obvious that "articles of different shapes may be formed in this machine."

In the making of bolt heads it is preferred to use four horizontal and one vertical die. The blank is held by adjustable nipping dies, a sufficient part projecting to form the head, which is effected by the descent thereon of the vertical die, followed by the lateral advance of the horizontal dies which alternately act upon the sides of the head in pairs.

[Printed, 10*d*. Drawing.]

A.D. 1865, October 11.—N° 2618. (* *)

WARREN, Frederic Pelham.—(*Provisional protection only.*) —"Improvements in bolts, rivets, and the like fastenings, for "connecting together pieces of metal and other material." "My improvements . . . . . . which are applicable to other "useful purposes, consist in forming the end or ends of a cylin-"drical or other sectionally shaped piece of metal cut from an "ordinary bar, or otherwise, in such manner that when driven "into a suitably shaped hole in the pieces of metal to be united "together the end or ends shall be expanded and completely fill "it so as to hold them in permanent contact: and this I effect by "splitting or otherwise dividing the end or ends of the bolt or "rivet so as to admit of one or more steel or other hard metal "wedges being inserted between the divided parts thereof for "the purpose of forcing the divided portions assunder when "driven into a blind hole, that is, a hole only drilled partially

" through the metal, or against a block, or when set up at both " ends by hammers, as circumstances may require."

[Printed, 4*d*. No Drawings.]

A.D. 1865, October 14.—N° 2652.

TANGYE, Joseph.—This invention relates to a machine adapted for cutting several screws at the same time. It is described as follows :—

" On the bed of the machine, and in the place occupied in " ordinary screw cutting lathes by the lathe head, is a head " carrying a fixed axis, on which the cone of driving pulleys " turns. Between the said pulleys and the said head is a pinion " connected to and turning with the said pulleys. The said " pinion gears with another pinion immediately over it, which " second pinion is fixed to a shaft passing through the head. " The said shaft is geared by means of toothed wheels to the " centre, to which one of the rods on which a screw is to be cut " is fixed. The said centre is immediately under the said shaft. " The motion of the said centre is transmitted by means of " pinions and toothed wheels to two other centres, one on either " side, and the three centres are thus made to rotate simultaneously, and give motion simultaneously to three rods on " which screws are to be cut. The centres between which the rods " to be screwed are placed are similar to those of the ordinary " screw cutting lathe. The rest, by which the cutting tools are " carried, is provided with three holders for carrying the three " cutting tools by which the screws are cut on the three rods " Each of the holders has an adjusting screw. The rest and the " three cutting tools are actuated by one screw. The arrangements of parts for cutting two or more than three screws " simultaneously, differ in no essential respect from the arrangements described."

[Printed, 6*d*. Drawings.]

A.D. 1865, October 30.—N° 2789.

WHITTLE, William.—This invention relates to machinery adapted for making nails from nail rods. The tapering form is given to the nails by passing the end of the rod to and forth between paracentric rollers, or between rollers eccentric to their axis, and having portions of their peripheries removed, the lateral spreading of the nail rod being prevented by side strips of hard metal of suitable shape, sustained by annular projections on the roller ends. These strips are attached to a sliding frame, and they enter between the rollers and are drawn back simultaneously with the bar. A second pair of rollers on the same axis finish the points of the blanks, which are then separately in succession presented by the workman to a pair of shears, to be cut thereby from the rod, the blanks falling down an inclining trough into a receptacle placed below to receive them.

Describes a nail making machine, in which are combined feeding rollers for entering the end of the heated rod, cutters for severing therefrom the blank piece, rollers for shaping and tapering the blank, other rollers for pointing it, and a heading tool operated by a cam, the pointed blank being held by grippers during the heading operation, and the rollers having side strips to prevent the lateral expansion of the metal.

Describes an upright heading machine for heading nails. A horizontal slide carries the nail blanks between the gripping tools, which being closed by the action of slides on toggle joints, hold the blank whilst a heading tool, operated by an eccentric or crank, descends upon the blank and forms a head; the buckling of the nail, should it slip between the grippers whilst being headed, is prevented by a yielding plug, on which the point of the nail rests.

Describes a horizontal heading machine in which the blanks are fed to the heading tool by a revolving disc.

The disc rollers employed for shaping the blanks are made from bars of iron bent round and welded, forming stout disc rings, which are afterwards turned and shaped, and the operating surface either case-hardened or converted into steel.

[Printed, 3*s*. 10*d*. Drawings.]

A.D. 1865, October 31.—N° 2806.

BAYLISS, Moses.—This invention, relating to the manufacture of spikes, is confined to the mode of dividing and cutting up the spike iron rods, and to forming either chisel or tapering points upon the cut off pieces, by preference in a cold state, by means of an ordinary or other convenient press of adequate power, the heading of the spikes being afterwards effected by any of the processes or appliances in common use. The bars are cut transversely into pieces of the required length for two spikes, and each piece is divided by an oblique cut, so as to leave on each half piece a chisel pointed end, or the bars may be transversely divided into lengths for single spikes, by alternate square and oblique cuts. The subsequent operation of finishing the points by means of powerful presses is preferred to be performed upon the metal in a cold state, which leaves the points of the spikes clean, hard, and free from scale. The cutting apparatus may be furnished with cutters of sufficient width to operate upon and cut pieces from several bars at the same time.

[Printed, 8*d*. Drawing.]

A.D. 1865, November 13.—N° 2921.

DAVIS, Henry Cogswell. — (*A communication from Cyrus Dexter Hunt.*)—This is an invention of a feeding apparatus for nail making machines, adapted to those machines which cut nails transversely from the ends of thin bars or narrow metal plates. The end of the bar about to be operated upon is held in a mortice cut in the end of a double ratchet bar, which has a double series of serrated teeth respectively formed along the opposite edges. This bar rests in a sloping position in guides upon a sliding frame, which reciprocates laterally upon the main frame, and by means of a spring and two pawls which engage respectively at each side with the ratchet teeth, the bar is moved forward at intervals, suitable to the working speed of the machine to which the apparatus is applied. A small shaft, mounted in bearings in the main frame, carries two cams, one of which by means of a lever carries back the two pawls, the advance of the feeding rack and bar being effected by the reaction of the spring; the other cam is embraced by a fork attached to the sliding frame, which is thereby caused to reciprocate laterally and impart the same movement to the feeding bar and nail plate, the end of which at each forward move is brought up to a stop gauge and held there by a spring.

[Printed, 8*d*. Drawing.]

A.D. 1865, November 17.—N° 2957.

CARTER, George.—(*Provisional protection only.*)—This invention relates to the manufacture of washers, and to the machinery employed. These washers made from rolled bars, are flat on one side and bevelled or convex on the other, with a central hole tapering through from the convex side. One of the rollers employed for rolling the bars has a plain surface, and the other is formed with indentations and central projections, respectively for shaping the washers externally, and making the central hole. The indentations are so close together, that the impressed plate or bar when passed between the rollers in a heated state takes the form of a series of partly developed washers, to be afterwards separated and finished by cutting tools in an ordinary press.

[Printed, *4d.* No Drawings.]

A.D. 1865, November 24.—N° 3024.

NEWTON, Alfred Vincent.—(*A communication from John McMurtry.*)—This invention, relating to the construction of rails and chairs for railways, and to spikes for securing the rails, consists :—

1st. Of rails which are made in longitudinal sections, or parts so bolted together as to break joint. Two examples are shown, one composed of two and the other of three parts, two of which form the base, and the other the top of the rail, the latter being capable of removal.

2nd. Chairs; of these several examples are shown variously shaped, respectively made either of cast iron, rolled wrought iron, or steel, in one or more parts, and of sufficient length to reach the distance of two sleepers, the two ends of the chair respectively resting on each. The top surface of the chair is curved so as gradually to rise from the ends, and stand flush or rather above the top surface of the rails, so that the tyres of the carriage or engine wheels when passing over the end joints of the rails, take to and transfer the weight to the sleepers, and thereby relieve the rail ends from the usual wear and tear.

3rd. Spikes are made with barbed points to insure their better holding when driven into the sleepers, and when barbed only on the inner face, the end of the spike when driven will curl outwards and take a very firm hold of the wood.

[Printed, *1s.* Drawing.]

A.D. 1865, December 9.—N° 3166.

WATTEEU, Emile.—This invention relates to machinery adapted for screw-threading bolts, and tapping nuts. The machine consists of a circular frame, which at the under side is furnished with an annular rib, formed to rest and slide round in an annular

V groove sunk in the upper side of the under frame. This circular frame carries a circumposed series of short horizontal shafts or mandrils, mounted severally in suitable bearings fixed upon the circular revolving frame at equal distances, each shaft pointing in a radial line to the common centre, which is occupied by a vertical shaft that receives the motive power, and by means of spur and pinion wheels imparts motion to the several mandrils, in either direction separately, through bevel gearing by means of sliding clutches. The outer ends of the spindles respectively are hollowed out to receive the head of a bolt or a nut, and the dies for threading bolts, or the taps for threading nuts, are carried by brackets attached to the revolving frame, one opposite to each mandril. By this means each mandril acts independent of the rest, and bolts and nuts of various sizes may be operated upon in the machine at the same time. The oil used to lubricate the taps and dies flows into an annular gutter.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1865, December 11.—N° 3200.

YORK, Henry Kinnaird.—(*Letters Patent void for want of final Specification.*)—This invention relates to an apparatus adapted for cleaning or finishing off rivets.

The apparatus consists of a revolving mandril, having one bearing and a back centre, and carrying a driving pulley attached to a conical friction clutch. The rivet is held between the converging jaws of a chuck, carried upon the projecting end of the mandril. Two cutting tools carried by a rest and disposed one above the other are employed and so mounted, that the top tool is made to operate first on the neck of the rivet and the underside of the head, and then the under tool comes into operation and finishes the top of the head, during which time the upper tool acts as a stay, and the jumping of the rivet is thereby prevented.

[Printed, 4*d*. No Drawings.]

A.D. 1865, December 12.—N° 3215.

NEWTON, Alfred Vincent.—(*A communication from Alexander McConnell White and Benjamin Butterworth.*)—The object of this invention is, to simplify and cheapen the construction of machines adapted for making bolts and rivets, which are without strain or injury, discharged from the machine by a movement of the heading ram and the divergence of the two parts which form the clamping dies, the services of one attendant for feeding the machine being all that is required.

"Upon a horizontal cast-iron bed a pair of clamping dies (so "shaped as to form a mould for the head of the bolt or rivet) is "mounted. Between these dies when open a given length of "rod or round bar iron raised to red heat is passed. The ex-"tremity of the rod enters a die box in close proximity to the "clamping dies, and in this die box a ram or plunger works, it "being actuated by a cam on the driving shaft of the machine. "When the rod is fed in, the clamping dies close upon and hold "it fast, they being preceded by an advancing cutter, which severs "a length of the rod sufficient to form a bolt or rivet. To reduce "this severed piece to shape, the ram or plunger before mentioned "now comes into action, and by putting an endway pressure on "the rod causes it to take the shape of the cavity in the combined "dies. This being accomplished the clamping dies recede, and a "slight continued motion of the ram or plunger caused by the "cam before mentioned discharges the formed bolt or rivet from "the die box. The return motion of the ram and the closing of "the clamping dies are effected by cams on the driving shaft "actuating wedge faced slides."

[Printed, 6*d*. Drawing.]

A.D. 1865, December 18.—N° 3266.

BURDICT, ORRIN CLARKE.—This invention consists of supplementary improvements on a prior invention relating to nuts and dies, for which Letters Patent, bearing date April 13, 1864, No. 1089, were granted to him.

In the working of the machines made according to the said invention, the finished nut had a tendency to cling to the sleeve when forced thereby from the die, and this difficulty is now removed by the use of a tappet, which is forced down by a cam against the nut. Another difficulty also arose from not being able to stop the machine immediately when disconnected from the moving power, the continued motion being due to the momentum of the moving parts. A remedy has been found in the use of a movable bar, which is hinged to the slide that carries the punching die; the slide is caused to move to and fro by two cams acting alternately, and the bar is placed in position to receive and transmit motion from the cam which advances the die. By this means the motion of the slide after being carried back by the other cam is instantly arrested, by altering the position of the bar, altho' the cam shaft continues to revolve.

For the purpose of making hexagonal nuts out of flat nut iron parallel bars without waste of metal, the bars are indented at the opposite edges, by a pair of appropriately formed dies, mounted at the side of the machine and operated, by means of a connecting rod, by a pin fixed eccentrically in the end of the main cam shaft.

The dies employed for making hexagonal nuts consist of six pieces, either the end or side face of each forming one of the six sides of the die. Square dies are also similarly constructed of separate pieces pressed together in a die box by means of screws.

[Printed, 1*s.* 4*d.* Drawings.]

A.D. 1865, December 23.—N° 3325. (* *)

NEWTON, WILLIAM EDWARD.—(*A communication from Henry Wurtz.*)—"Improvements in the preparation of glue or gelatine " so as to render it insoluble in water, and applicable by the " admixture of other substances to various purposes for which " common glue or gelatine cannot now be used." This prepared glue or gelatine is capable when dry "of being wrought like ivory, " bone, and horn;" it is applicable to a great variety of purposes, among which are mentioned shades, reflectors, and oil reservoirs.

The glue or gelatine is heated "in the form of a strong solution " in water, together with a strong solution of chromic acid, or of " an alkaline bichromate." Before the bichromate is added, "the " characters of the final product may be greatly and variously " modified" by the admixture of various substances according to the purpose for which the preparation is intended. Weight may be given by means of "heavy substances in powder." Hardness may be increased by "sand, clay, emery, pounded glass, red oxide " of iron (jewellers' rouge), or tripoli;" and strength and toughness by the addition of chopped fibre, such as "cotton, hair, spun " glass, asbestos." Different coloring matters may be added, and brittleness (when in the form of very thin sheets) may be prevented "by rubbing it with glycerine." In order to obtain " homogeneity of mixture," the materials are sometimes ground together in a mill, "the grinding surfaces of which are of course " to be kept heated sufficiently to prevent the gelatinization of

" the liquid." When powders of a greasy or resinous nature are used, "the powder may be slightly moistened with diluted " alcohol." When compounded, before modification by the bichromate with glycerine it may be used for washers.

[Printed, 6*d*. No Drawings.]

1866.

A.D. 1866, January 2.—Nº 12.

BRUFF, Peter Schuyler.—This invention relating to railway fastenings consists in part of a durable method for securing flanged rails, such as contractors and similar rails, direct to the sleepers or longitudinal bearers on which they rest. For this purpose is employed an iron clip, "having a lip which presses upon the " flange of the rail, a shoulder which abuts against its edge, with " or without projections on the under side, which bed themselves " into the sleepers, and a hole or holes through which a screw or " flanged bolt or bolts passes or pass to hold it down, and thereby " secure the rail firmly in its place on the sleeper. The screw or " flanged bolt or bolts may either be similar to coach screws " or ordinary fanged or jagged bolts, passing through the hole " or holes in the clip, and screwed or driven into the sleeper; or " a screw bolt or bolts passing through both the clip and the " sleeper, with either a solid head and square shoulder and with " a fang washer underneath and a nut above, or with a solid head " above and screwed into a fang washer nut beneath the sleeper." No holes are required to be made in the rails. Modifications of these fastenings are exhibited and described.

The other part, relating to bolts for holding railway chairs or rails, consists in jagging or serrating the shanks of such bolts in a helical or spiral direction, instead of irregularly as heretofore, in order that the bolt, which is to have a square head, may be capable of withdrawal or unscrewing from the sleeper, without injury to the fibres of the wood, by means of a spanner.

[Printed, 10*d*. Drawing.]

A.D. 1866, January 10.—Nº 74.

SADLER, John.—(*Provisional protection only.*)—This invention, relating to self-feeding nail and brad cutting machines, is

described as follows :—“ I place under the frame of the machine
“ a shaft horizontally, which is driven by means of bevil and
“ mitre wheels from the main shaft. Upon this shaft I place a
“ camn, or I attach to it a crank and pin or eccentric; such
“ crank, camn, or eccentric may form part of such shaft. To this
“ camn, eccentric, or crank I attach two links to connect the two
“ heading levers with the shaft, and giving the said heading levers
“ an alternating motion, so that the levers advance to drive for-
“ ward the header each time the thick end of the nail blank is
“ presented towards it, and the blank being held fast by the
“ holding dies so as to prevent it slipping the header is forced
“ against the end of the blank and presses upon the blank a head.
“ The heading levers are also used to give motion to a guage for
“ the purpose of guiding the strip between the cutting blades.
“ I connect this guage to one or to both levers, thus giving to
“ the gauge an alternating motion and carrying the strip to the
“ position required to cut off the blank and brad. I also con-
“ tinue the horizontal shaft from the camn, eccentric, or crank to
“ a suitable distance, terminating with another crank and pin,
“ eccentric, or camn; by the rotating of such camn, eccentric, or
“ crank I communicate an alternate or rocking motion to a car-
“ riage for supporting the feeder; by this means the blank is cut
“ off at the requisite angle to give the taper to the blank that is
“ necessary to form the nail and brad. I also obtain this alter-
“ nating or rocking motion by connecting the heading lever and
“ the carriage of the feeder together by means of levers, thus
“ giving an alternating or rocking motion to the feeder carriage,
“ and producing the necessary angle in the blank to make the
“ nail and brad.”

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 16.—N° 146.

MELLOR, George.—(*Provisional protection only.*)—This invention, relating to the manufacture of nails and spikes, consists of machinery adapted for pointing headed blanks or rods. The process is effected by rollers furnished with grooves of varying depth, and made to oscillate on their axes by means of a lever arm, which is fixed on the axis of one roller and connected to a crank; the rollers being geared together revolve to and fro simultaneously at a uniform speed, and the varying hollow space formed respectively by the groove in each roller is equivalent in form and constitutes a swaging mould for shaping and pointing the blanks, the deepest part of the grooves at the extremity of the forward motion, and the shallowest part at the extremity of the backward motion of the rolls, successively coming together and receding. The blanks in a heated state are introduced at the proper moment and seized by the rollers near the head, whence, as the space between the grooves gradually diminishes, they are tapered and shaped to the point. Large blanks may be passed into several grooves in succession. The rollers have flanges to prevent the lateral spreading of the metal.

[Printed, 4*d*. No Drawings.]

A.D. 1866, January 31.—N° 305.

BONNEVILLE, Henri Adrien. — (*A communication from Cadet Pierre Dubuisson.*)—This invention relates to the manufacture of nut-blanks, tubes, gun barrels, and similar articles, from the scrap iron or cuttings made in the process of turning, shaving, punching, or planing articles of wrought iron. The material is introduced by ramming or compression under hydraulic or other power, into a cylindrical prismatic, or polygonal mould by means of a tubular piston, which slides on a central mandril contained in the mould for the purpose of forming the hole or bore. By this means the particles of metal are first partly agglomerated, and they are next heated and then welded together by hammering or rolling, according to the object of its use or the shape or form required. When intended for making nut-blanks, the hexagonal or other form is given to the moulded tube or mass by passing it between the correspondingly grooved rolls of a rolling mill, and it is afterwards cut into transverse slices by a circular saw, or by a dividing tool in a lathe, whereby the chamfering and rounding of the base and top of the nut may be effected, prior to which the external sides of the welded tube may be ground or placed to the required size.

[Printed, 4*d*. No Drawings.]

A.D. 1866, February 10.—N° 426. (* *)

HUGGETT, John. — "Improvements in the manufacture of " horse nails, and in apparatus employed therein."

The nail rod, heated at its end, is held on a table, and acted *upon by* instruments carrying small rollers; "there are three "such instruments, two of them when in operation act on the sides of the rod, which they nip between them, and the other at a short distance from the nip of the side rollers, bears on the top of the rod and presses it down on to the table or support on which it rests."

"The rollers are caused to bear against the heated end of the rod at a short distance from its extremity towards which they are then drawn. During this motion the instruments are guided by pattern surfaces which compel the rollers to compress or draw down the rod and bring it to a point. The instruments act several times in the manner above described before the drawing down is complete, and in returning the instruments recede so that the rollers do not then come in contact with the nail rod."

"The pattern surface which governs one of the forming instruments is connected with a handle, by means of which the workman can move it forward a short distance when necessary; by this means the roller carried by this instrument is caused to compress the metal to a somewhat greater extent, and the rod will be properly pointed. More than one of the pattern surfaces may, if desired, be connected with the handle as above described."

"The apparatus is arranged in the following manner:—A slide is caused to move to and fro by connecting it (in such a manner that it can be thrown out of gear when required) with a crank on a rotating axis, to this slide the forming or drawing down instruments are jointed at one end, and each of them carries at the other end two small rollers, one for operating on the nail rod," "and the other running upon the pattern surface. The instrument which acts on the top of the rod projects beyond those at the side, so that it acts immediately after them. The pattern surfaces or two of them are so mounted as to be able to slide a short distance to and from the nail rod when they are in operation; they are supported at the back by wedges, but during each return stroke of the slide the wedges are partly withdrawn, and the pattern surfaces recede so as to allow the drawing down rollers to return without acting on the nail rod. The wedges are moved in and out by stops on the main slide coming against parts to which the wedges are fixed. When the rod is properly drawn down, it is cut off by shears, and the rod is retreated for making another nail. Each nail rod

" which is being worked, has a sliding gauge placed upon it to
" regulate the length to be drawn down; this gauge is set each
" time, immediately after shearing off a nail."

[Printed, 10*d*. Drawing.]

A.D. 1866, March 1.—N° 623.

ANDREWS, ALFRED CHRISTMAS.—This invention relating to screw rivets for boat pegs, and screw nails for other purposes, and to the machinery employed in the manufacture, and partly adapted to other purposes, consists;—

1st. In cutting coarse pitch screw threads upon the shanks of rivets and nails, commencing from the top, and terminating at that part of the other end where it begins to taper to a point, the depth of the thread varying in proportion to the diameter of the shank. Whilst being driven, the screw threads cause such rivets and nails to rotate, and to adhere more firmly to the material into which they are inserted.

2nd. On the bed of the machine employed is mounted to slide reciprocally, a carriage which obtains its movements from an eccentric upon the main shaft. This carriage carries a pair of rotating threading dies, and an apparatus for guiding the wire (out of which the rivets and nails are made), through them lineally in the direction of a pointing tool, carried in the hollow end of a mandril, which is mounted to slide to and forth in a headstock fixed on one end of the machine bed, and interposed between the headstock and the carriage, on an upright part of the bed, is a pair of grippers and a circular saw. The grippers prevent the rotation of the wire, and relax when it is advanced; the cutting tool is brought forward by the mandril and points the end, which the circular saw cuts off at a regulated length, the finished pieces falling into a receptacle placed below to receive them.

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1866, March 1.—N° 631.

LAKE, WILLIAM ROBERT. — (*A communication from Lewis Alexander Osborn.*)—This invention, relating to the manufacture of split railway spikes, adapted for fastening railway rails to wooden sleepers, consists in longitudinally splitting the shank of the spike, which in transverse section may be either round, square, *or other* form and parallel throughout its length, by means of circular saws or otherwise, the division of the shank extending from the end to about four-fifths of its entire length, the remaining portion under the head being left solid. The chief novelty consists in the manner in which the two halves or prongs are pointed, in order that when the spike is driven into the sleeper, the pointed ends may diverge in opposite directions parallel with the plane of the saw cut, and not in a direction at right angles therewith. This result is obtained by chamfering the two ends respectively from the opposite sides or corners, the inclined plane of the chamfer on the side of one end crossing the inclined plane of the chamfer on the other. It is stated that "spikes formed in "this manner can be driven into any portion of the sleeper irre- "spective of the direction of the grain of the wood, and as "quickly as solid spikes, without previously boring a hole in the "wood."

[Printed, 8*d*. Drawing.]

A.D. 1866, March 6.—N° 680.

LAKE, William Robert. — (*A communication from Lewis Alexander Osborn.*)—This invention relates to a duplex machine, adapted for making bolts, rivets, spikes, and similar articles, by two sets of apparatus respectively disposed to operate simultaneously at opposite sides of the machine, each set comprising a revolving disc or die holder, caused to move intermittently on a fixed axis by a revolving tappet, and carrying a circumposed arrangement or series of dies, which severally by turns co-operate with a heading die, fixed in a socket projecting from one end of a reciprocating sliding frame, in the opposite projecting end of which is another socket and heading die, which co-operates with a counterpart set of apparatus disposed on the opposite side of the machine, consisting of a similar revolving die holder, moved intermittently by a tappet on the end of the same shaft which carries the tappet that operates the die holder pertaining to the other set of apparatus. The sliding frame which carries the heading dies embraces an eccentric which is fixed on the main shaft, and rotates in a sliding collar that moves up and down between opposite transverse surfaces forming an opening midlength in the sliding frame, which thereby obtains its reciprocating motion. The ends of the heated metal bars, out of which the bolts and rivets are to be made, are fed to each set of apparatus through holes in steel cutter plates, which are fixed to the machine frame respectively in contact with the outer surface of the revolving die holders, the die holes in which by turns at each stopping interval, come directly opposite the holes in the plates, and receive the end of the heated bar, which is passed through and projected from the opposite side of the die holder, and stopped by an adjustable gauge, the length projecting being sufficient to form the head on the bolt or rivet. When the die holders move, the pieces are cut off the rod by the edges respectively of the dies and the holes in the cutter plates, and remaining in the die holes are, at the next movement of the die holders, brought directly opposite the heading dies. The heads being formed by the advance of the latter, the headed bolts or rivets are carried on by the succeeding movement of the die holders into a position opposite a clearing punch, which pushes them out of the dies. One set of apparatus may be engaged in bolt making, whilst the opposite set is producing rivets or spikes.

[Printed, 10*d*. Drawing.]

A.D. 1866, March 10.—N° 734. (* *)

SIMONS, William.—(*Provisional protection only.*)—"Im-
" provements in bolts to be used in the building or construction
" of ships or vessels." "This invention has reference to the appli-
" cation of a bolt of peculiar construction to be used in the
" structure or building of ships or vessels of that class known as
" composite; it also refers to the manufacture of the bolts them-
" selves. In making such bolts they are first forged, and the
" screw thread is formed on them in the usual manner, and
" instead of leaving the body of the bolt smooth, as hitherto, it
" may be" "made rough by indentations, chisel blows, or other-
" wise, in order that the covering of yellow metal, copper, or
" other material in which they are cased may have a more firm
" and secure hold thereto." The covering of such bolts may be effected by forming a mould or moulds into which the bolt to be encased is placed, an annular space being left between the sand and the part of the bolt to be covered, into which the metal or material used for covering is poured. Or in lieu of casting the metallic covering on to the bolt a piece of metal has a hole bored in it of a diameter slightly less than the part or parts of the bolt to be covered, this piece of metal when bored being heated so as to expand it, at which time the bolt is placed therein, after which

the covering is contracted by cooling, and remains firmly fixed to the bolt. In fastening together the various parts of a ship (in which timber and iron are jointly employed) by such bolts, the injurious corrosion caused by the contact and action of sea-water is effectually prevented.

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 12.—N° 746.

LINFORD, CHARLES.—(*Provisional protection only.*)—This is an invention of "apparatus for paring, burnishing, polishing, or other-" wise finishing articles manufactured of leather." It is applicable for cleaning off, scraping, or paring the bottoms of boots and shoes, and for reducing or levelling the projecting heads of rivets, and of screws or brads which are inserted in the soles. It may be adapted either to the periphery of a revolving cylinder, or to the surface of a reciprocating block or board, and consists in fixing upon either a rotating or a plane surface moving to and fro, by screws or otherwise, sharp knives, files, burnishers, and such other similar instruments as the nature of the work may require, an adjustable guide being attached to the apparatus for regulating the cutting depth or distance between the operating points, edges, or surfaces of the instruments, and the object upon which they are set to operate.

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 24.—N° 879. (* *)

BOGGETT, WILLIAM.—(*Provisional protection only.*)—"Im-" provments in the manufacture of metal bolts and rods for " shipbuilding and other purposes." The primary object of this invention is so to shape three segments of a rod, longitudinally, that when placed together and passed between rollers the pressure shall compress them inseparably together into a solid cylindrical bolt suitable for use in shipbuilding and other purposes. The inner segment or core being composed of iron or steel, the other two, or the enclosing segments, may be of copper. The inner core is a nearly round bar slightly indented on two sides. The enveloping metal being forced into these indentations locks the parts together. The core at both ends of the bolts is composed of copper or brass with a view to protect the iron from oxidation.

Rods of various shapes can in like manner be made as previously described, or with other combinations of metals.

[Printed, 6*d*. Drawing.]

A.D. 1866, April 20.—N° 1125.

RUPPERT, Frederick.—(*Provisional protection not allowed.*)—This invention relates to the contruction of a wheel pinion applicable to driving pulleys and apparatus capable of imparting differential speed to machines and operators. It is adaptable to lathes employed in cutting screws, and for other purposes, where an acceleration of speed is desirable during the return of the cutting tool, the driving pulley combining grooves or convex surfaces of different diameters, suitable for either a round band or strap, being loose upon the lathe mandril, may either impart motion to the mandril at its own speed by direct connection, or it may send its power through back gearing, and turn the mandril with great increase of power, but with a proportionally diminished speed.

[Printed, 4*d*. No Drawings.]

A.D. 1866, April 30.—N° 1219.

FOX, Charles Douglas. — (*A communication from John Howard.*)—This invention, relating to screw cutting and threading machines, and to screw nails and spikes, has for its object:—

First. In reference to machines, improvements in the constructive details, consisting of,—1st. A ratchet and catch attached to the inside of the friction pulley, the ratchet having notches corresponding with the number of threads required to be cut on the screw-blank. 2nd. The use of spiral springs in the hub of the main pulley, for regulating the pressure of a pair of jaws upon screw-blanks slightly varying in size. 3rd. The construction of the "firmer," which is made hollow and slipped upon a rod fastened to the firmer plate, and secured in position by a screw. 4th. Making the firmer adjustable to screw-blanks of different lengths, and capable of being turned when worn. 5th. Hanging the firmer plate on a central screw, and securing it in position by set screws, so that screw threads may be cut on either a parallel or tapering blank. 6th. The application of a bent revolving fork for picking the screw-blanks out of a hopper and placing them on a conducting track. 7th. The use of bevel gearing for imparting intermittent motion to the fork, a portion of the teeth on one wheel being cut away. 8th. Employing an intermittently revolving graduated cam to move a bar, which operates the device whereby the depth of each cut is determined. 9th. Relates to a device for steadying and pointing the screw-blanks. 10th. Making the threading tool adjustable to blanks of different lengths.

Second. Screw nails and spikes are made with cross nicked pyramid heads, the edges of the nick being chamfered to prevent its closing when the head is struck.

These spikes taper from beneath the head to the point, and the whole length of the shank is screwed with a thread coarse in pitch, the top of the thread being square with the axis of the shank, and the underside an acute angle therewith. They are intended to be driven into the wood or material, and withdrawn by the aid of a screw-driver.

[Printed, 1*s*. Drawings.]

A.D. 1866, May 9.—Nº 1325.

FLETCHER, James.—This invention relates, first, to machines adapted by a process of rolling to the making of rivets and other articles requiring heads or shoulders. Two rollers furnished, one or both of them with a cutting disc and mounted in fixed bearings, are combined to operate in conjunction with one or two other rollers, mounted in a sliding frame, or in a swivel arm. The bar of metal in a heated state is pushed longitudinally between the two fixed rollers up to an adjustable stop pin, and then the slide with the movable roller is forced forward by an eccentric. The cutting edge of the disc severs the required length from the bar, and the three rollers compress the cut-off piece and reduce it to the proper diameter, the head and shoulders being formed by the shape of the face of the disc, or by suitable grooves in the rollers. When the machine is provided with two movable rollers, they are carried by one slide, but act alternately and independently on different pieces of metal.

The second part of the invention relates to apparatus which, by means of two or more cutters affixed to a disc or plate, and companion cutters fixed to the frame, is adapted for cutting or severing in a cold state metal bars or beams with flanges or otherwise, without distorting either the beam or the piece cut off. The apparatus is exhibited as applied to a portable cutting and shearing machine, and in a modified form it is shown in combination with a compound shearing and punching machine, and also is applied to an ordinary shearing and punching machine, provided at one end of a lever with cutters adapted for shearing a T-shaped bar, and with cutters at the other end of the lever for shearing angle bars.

[Printed, 1s. 4d. Drawings.]

A.D. 1866, May 31.—N° 1515.

BELLHOUSE, Edward Taylor, and DORNING, William John.—This invention relates to the manufacture of keys, cotters, wrenches, nut-blanks, and similar articles, which by hydraulic power are punched, pressed, or stamped out of plates of metal; " and the apparatus may consist of an arrangement of upper and " lower dies or punches formed accurately to the pattern of the " article required. One set of the dies are actuated by direct " hydraulic pressure, and act upon the plate of metal so as to " punch or press out the article between the die and its matrix. " The punches or dies and matrices may be applied in several " methods, and it will be here sufficient to state that an ordinary " hydraulic press is employed, and that, for example, a steel " matrix is placed on the press table, and the metal (either in a " heated or cold state) is placed above and upon it, and the die " is secured to the crosshead of the press or placed on the metal " directly above the matrix; the pumps then being worked the " die is forced into the matrix, and a corresponding form is" stamped "out of the metal plate by the die and pressed through " the matrix; this or equivalent means may be adapted for flat " articles, such as "keys," "spanners," but for half round or " round articles as pins, bolts, or nuts, the matrices will be " formed in two halves, each giving form to the upper and lower " portion of the article stamped."

[Printed, 4d. No Drawings.]

A.D. 1866, June 5.—N° 1553. (* *)

TANKARD, James Marsland, and COCKCROFT, John.— " Improvements in or applicable to machinery or apparatus for " spinning worsted or other fibrous substances, known as cap " frames."

This invention consists "in applying a glass washer betwixt " *the tube* and the lifter plate on each cap spindle or stud instead

" of the wood or metal washers heretofore employed," these glass washers being formed (by preference) concave on the upper surface, in order to facilitate the lubrication of the spindles or studs and the tubes sliding thereon.

The patentee states that by means of this invention friction is diminished, and consequently the wear and tear of the machinery, and that the yarn is more regularly twisted than is ordinarily the case, and a saving effected in the consumption of driving bands and oil.

The washers may be formed by casting flint glass in moulds, or by cutting them out of plate glass, but the patentee recommends the former, on account of that system affording the means of producing them with the concavity on the upper surface, which the other system does not.

[Printed, 4*d*. No Drawings.]

A.D. 1866, June 12.—N° 1596.

LIMET, Pierre Hippolyte.—This invention relates to apparatus adapted for furrowing, grooving, indenting, or corrugating the surface of metallic substances; it is applicable to the manufacture or cutting of files, and to indenting or raising threads on screws or other articles. The effect is produced by pressure, and the instrument employed is a revolving steel disc, the periphery of which is reduced to a sharp bevel and tempered. The "disc " revolves freely on an arbor fixed to a tool carrier and slide, " to which a suitable reciprocating motion is imparted for causing " the said disc or impressing tool to travel to-and-fro in an " oblique direction over the blank, and thereby impress or sink " in the surface of this latter the successive furrows which " constitute the file, whilst by means of a suitable step-by-step " motion the blank is caused to advance for the required distance " after the impressing of each furrow."

[Printed, 10*d*. Drawings.]

A.D. 1866, June 19.—N° 1644.

LUCAS, Felix Benjamin.—The object of this invention, which relates to the manufacture of screw bolts and nuts, is to prevent them loosening or unscrewing when subjected to tremulous motion, concussion, or other disturbing influence. To this end the nut, being screwed on to the bolt, is keyed in the same manner that a wheel is keyed on a shaft, the bolt and nut respectively having a dissimilar number of grooves cut in the direction of their axes across the screw threads, to form when two come together, a key bed; and in order that one of the grooves in the bolt and one in the nut may come quickly into coincidence by turning the nut a slight portion of a revolution, the number of grooves is either two or three in one piece and three or four in the other. By using two and three grooves respectively in the nut and bolt, a sixth of a turn, or portion of a sixth when the nut is tolerably well tightened up, will suffice to bring one of the grooves in each piece into coincident position for forming a key way or bed to receive the key, and when three and four grooves respectively are made in the nut and bolt, one twelfth of a revolution or portion of a twelfth will suffice. The same system of grooving the nut and bolt is applicable to all kinds of key pieces, whether springs or otherwise.

[Printed, 8*d*. Drawing.]

A.D. 1866, June 19.—Nº 1648.

BENTALL, Edward Hammond.—(*Provisional protection not allowed.*)—The object of this invention, which relates to the manufacture of nut blanks from bar iron rolled to "such shape that " they will only require to be severed by transverse cuts to be " converted into nut blanks fit for drilling. Hitherto the bars " have been rolled of a section the figure of the plan of the nut, " or with a uniform thickness throughout, the severing cut there" fore extends over the whole face of the nut; thus not only is " considerable power required to make the cut, but the blanks " are liable to be formed of varying thicknesses, and with their " faces untrue, and consequently they could not with certainty be " set true in the drilling machine. By my method of rolling the " bars I get the faces perfectly parallel, and supposing a six-sided " nut to be required I roll four of the six sides true, which ensures " the proper central adjustment of the nut blanks in the drilling " machine, and the cut to sever the nuts is moreover made at the " narrowest part of the rolled bar. The cut may be produced " either by a shearing or a ploughing action, and thus little waste " of metal will occur in the operation."

[Printed, 4*d*. No Drawings.]

A.D. 1866, June 25.—Nº 1689.

BROOMAN, Clinton Edgcumbe.—(*A communication from Henry Titus.*)—The object of this invention is, so to form the underside of the heads of wood screws, that when such a screw is driven it shall act as a counter-sink, and form a flat conical enlargement round the top of the hole, in which to bed itself. To effect this, two cutting edges are formed by grooving the underside of the head downwards, commencing from each end of the nick, and terminating where the base of the head is united to the neck of the shank. One end of each groove is fashioned to act like the cutting edge of an auger, the two grooves form passages for the exit of the chips, and they do not disfigure the top surface of the head of the screw.

[Printed, 6*d*. Drawing.]

A.D. 1866, June 28.—Nº 1729.

DEACON, Simeon.—(*Provisional protection only.*)—This invention relates to machinery or apparatus adapted "for drilling "iron and other metals, also for boring wood, for tapping nuts, "and screwing bolts." The apparatus is mounted on a suitable iron bed, supported on standards and carrying a headstock and adjustable brackets. Into a screw-threaded hole made through the upper part of the headstock, there is screwed a long bush which projects and carries a hand wheel, and through the bush is passed the small or tail end of a mandril, which carries a winch handle. The other end of the mandril passes through a bearing hole in an upright bracket fixed upon the bed, and formed in the extreme end of the mandril there is a square hole to receive a drill, tap, bit, or other tool. Another bracket is also fixed on the bed for the purpose of supporting the metal or wood articles against the pressure of the drills or bits, or to hold nuts during the process of tapping, and to hold dies whilst screwing bolts. The rotation of the mandril and operating tools is effected by the hand of the operator by means of the winch handle, and the tools are advanced as the work progresses by turning the bush by means of the hand wheel.

[Printed, 4*d*. No Drawings.]

A.D. 1866, June 29.—Nº 1740.

GRIFFIN, Henry.—This invention relates to combining, for the purpose of imparting increased strength to articles manufactured from india-rubber, metallic net work or woven iron or brass wire gauze, which is laid between two thicknesses or sheets of the rubber, and the whole is then passed between rollers previous to the process of vulcanizing. The pressure of the rollers forces the contiguous surfaces of the two sheets of rubber through the interstices of the net or gauze into adhesive contact, so that the metallic net or reticulated material becomes imbedded betwixt them. In the same manner several thicknesses may be combined, and to ensure the perfect adhesion of the rubber surfaces, a solvent may be previously applied thereto. The substance thus produced is used for valves, hose, packing, and various other purposes, including washers, which may be cut out of the substance manufactured as above described, or the reticulated wire work may be applied externally, so as to form the circumferential periphery of the washer. It is stated that "wire cloth or fine reticulate "metal openwork thus combined with india-rubber, or a com- "pound thereof, will be found to admit of all necessary flexibility "and at the same time to add greatly to the strength and dura- "bility of the articles so obtained."

Woven fabrics of fibrous material may be preferably employed for some purposes in lieu of wire gauze.

[Printed, 1*s*. Drawings.]

A.D. 1866, June 30.—N° 1743.

LAVATER, MANUEL LEOPOLD JONAS.—This invention relates to pegs and brackets, adapted for attachment to shop windows and other places without the use of nails, screws, or other fastenings, the pegs which are of various forms, being fixed to the brackets and used for the purpose of suspending articles intended for exhibition, sale, or otherwise. The adhering surface of the bracket being first smoothed by any convenient means, is covered with a paper label or other material gummed on both sides, and whilst the gum is soft the bracket is gently pressed against the glass, in the situation it is intended to occupy. In this position it is supported until the gum is dry, when the bracket will be found to be firmly adhering to the glass. Other gummy or viscous substances may be employed as the adhesive medium, but gum arabic is preferred. In some cases the gum may be spread on the bracket and applied direct to the surface of the glass without the interposition of the paper label.

[*Printed, 8d.* Drawings.]

A.D. 1866, July 3.—N° 1765.

ADKINS, William.—(*Provisional protection only.*)—This invention relates to taps and dies, and to machinery employed in cutting screws. The grooved surfaces cut across the threads of the tap, instead of running lineally with the axis, are made to circumvest the tap in the spiral form. By this means it is stated "the work of tapping will be done with more precision, regu-"larity, and speed than can be effected by ordinary taps for these "reasons, that the bite of the thread of the tap is progressive, "and the cutting edge acute instead of at right angles, whilst "the particles removed from the part tapped by the progressive "turning in of the tap will gradually work up the spiral grooves, "and thereby clear the said tap and prevent the ordinary "clogging."

The lower end of the tap is fashioned with one or more cutting edges like a drill, in order that when tapping a nut, it may clear its way in the hole.

Dies are also grooved across the threads at an angle more or less acute, instead of as heretofore at right angles, and these spiral or diagonal grooves may be cut both on taps and dies in an ordinary screw cutting lathe, fitted with the usual appliances.

[Printed, 4*d*. No Drawings.]

A.D. 1866, July 5.—N° 1780.

GEDGE, William Edward.—(*A communication from Joseph Jules Falatieu.*)—This invention relates to "manufacturing by the "aid of a special arrangement of cylinders or rollers a novel sort "of bar or rod, suitable for making horse-shoe nails." The rollers employed are mounted in the usual manner between housings or side frames, provision being made for regulating the pressure by means of screws, which are set down on the top coupling of the axis of the top roller, the axis of the bottom roller resting in bearings supported by the frame. Both the rollers are double grooved at regular intervals longitudinally, the transverse form of each groove representing one-half the head of a nail, and on the axis of each roller there is one of a pair of tooth wheels, which engage together, and give to the rollers a uniformity of speed, so that the several pairs of grooves in one roller always come exactly opposite the pairs of grooves in the other, and so form a series of constantly closing and opening, revolving dies or moulds. The metal rod is passed transversely between the rollers, and is drawn out or elongated by the pressure of the plain portions of their surface, whilst the pairs of grooves leave on the rod a series of double enlargements, in form resembling the heads of nails. The rods are afterwards cut into lengths, the division being made between the two enlarged parts left by the grooves. These pieces are subsequently to be forged into nails, either by hand or by suitable machinery.

[Printed, 8*d*. Drawings.]

A.D. 1866, July 11.—N° 1816.

HASELTINE, George.—(*A communication from William Judson Clark.*)—This invention relates to the manufacture by means of swaging dies of screw-bolts from round bar iron, a portion of the length of such bolts being formed square or angular in transverse section and the other portion round, and to the dies employed. The shanks of the bolts are made by a pair of steel, cast iron, or other metal dies, wherein the grooved chamber for a portion of its length is cylindrical, and the other portion angular, care being taken to properly graduate the change from the round to the angular form, and have the same measure of metal in all parts of their transverse areas, so that the quantity of metal required to fill the angular corners of the dies by the lateral compression must in like quantity be forced from the sides, which are consequently made hollow or longitudinally concave, or if necessary an additional quantity of metal may be obtained by longitudinal compression when the head is formed. The dies when closed and containing the newly formed blank constitute an anvil, upon which a portion of the blank piece, which is left projecting from the angular part of the cavity in the dies, is to be upset and formed into a head by appropriate machinery adapted to the purpose. The square or angular portion of the grooves in the dies is planed out, and the round part, whilst the dies are held in a chuck together, is bored out with a milling tool.

[Printed, 8*d*. Drawing.]

A.D. 1866, July 21.—N° 1894.

LUCAS, Thomas Holden.—(*Provisional protection only.*)—The object of this invention, relating to the manufacture of nails, is to make by machinery nails much cheaper and, for all practical purposes, as good as nails made by hand. The machine "consists "of two side slides, which are actuated by cams, one front slide "actuated in a similar manner, and a header, actuated also by "a cam or other mechanical equivalent. The necessary motion "is given to these by means of spur and bevel wheels suitably "placed."

"The operation of the machine is as follows:—A strip of iron "is fed from the back of the machine in the usual manner, and "as is well understood, between the two side slides. The right-"hand slide is caused to go forward and cut off the iron to the "required length. The piece of iron so cut off is now carried "between the two side slides towards the left hand, and when "arrived in the proper position the front slide is caused to advance "upon it, and in this manner the sides of the nail are formed; "the header then comes down upon the top of the nail, and the "head is thereby formed. The right-hand slide now reverts to "its normal position, and a spring being now free to act causes "the header to recede. At the same time the front slide is also "caused to evert to its normal position. The nail being now "completed is thus released and falls through into a receptacle "provided; a spring forces the left-hand slide into its proper "position for receiving the next strip of iron, and the operation "herein-before described is repeated continuously."

[Printed, 4*d*. No Drawings.]

A.D. 1866, July 21.—N° 1900.

BAYLISS, Moses.—This invention, relating to machinery adapted to the manufacture of bolts, spikes, and similar articles, has reference more particularly to apparatus adapted for forging, shaping, and finishing the heads. The heated pieces of metal intended to be formed into bolts or spikes, are severally placed in dies concentrically circumposed at divisional distances in a horizontal intermittently revolving die holder or table, which at each move or portion of a revolution brings the loaded dies in succession beneath the heading tools, and resting whilst they operate. The heading tools are fixed in the lower end of a vertical slide, so as to co-operate simultaneously with three of the dies; two of the tools are called dumping dies, whose office is to upset the heated ends of the pieces of metal, brought directly beneath them in succession by two of the onward movements of the die holder; thence by the next movement the half-formed bolt heads come *directly beneath* the third tool or heading die, which gives to the heads the final shape and finish. The bolt pieces are supported in the table dies by sliding plugs or pistons, called " dummies or " pimplers," which rest upon an inclining or variable surface fixed beneath the die holder. By this means the height that the bolt projects from the die is regulated, After being operated upon by the first dumper, and whilst passing on to the next, the bolts are gradually raised by the incline, and after leaving the finishing die, they are further raised and ejected from the die holder by a rod, which lifts the dummies after they leave the incline. One, two, or more dumping dies may be used in conjunction with the heading and finishing die.

[Printed, 8*d.* Drawing.]

A.D. 1866, July 31.—N° 1973. (* *)

GEDGE, WILLIAM EDWARD.—(*A communication from Pierre Armand Protard.*)—(*Provisional protection only.*)—" An improved " fastening, intended to replace the ordinary screws and nuts in " bedsteads and articles of furniture generally." The fastening is composed " of a spindle, carrying a square and circular part, " the whole moving round an eccentric rod fixed to one of the " pieces, which are to be fastened together," and " of a catch or " hook, which by means of the spindle, when set in motion by " the aid of a key or lever, receives a come-and-go motion, fixing " it to or withdrawing it from a bolt or pin fixed on the other " part to be joined; the spindle moves in the space left in the " hook or catch, so that it is only necessary to exert a pressure on " the key or lever to take down or set up the bedstead or other " article of furniture."

[Printed, 4*d.* No Drawings.]

A.D. 1866, August 6.—N° 2019.

PARSONS, PERCEVAL MOSES.—(*Provisional protection only.*)—This invention relates to the permanent way of railways, and to screw-bolts applicable thereto and to other purposes. As regards railways, it consists in employing at the crossings, a double-headed steel rail for the point and wing rails, hardened and tempered by plunging them at a red heat into a bath of oil or oleaginous substance. The particular section or shape and mode of fitting up are also described.

Fish-plates for securing the joints of rails, are made of steel or *carbonized* iron, hardened and tempered in the same manner.

Screw-bolts, employed to fasten fish-plates to railway rails and for other purposes, are strengthened, made more elastic, and better capable of resisting strains and vibrations, without loosening or breaking. These results are obtained by making such screw-bolts of steel, or iron sufficiently carbonized, and afterwards treating them in a heated state, in an oil or other unctuous bath, in the same manner to harden and temper them as is practised with regard to the fish-plates and rails, and, in order that the process may have a uniform effect throughout the bolt and every part be extended equally under strain, the plain parts of the stems or shanks are made tubular, or in a form differing from the part which is screwed.

[Printed, 4*d*. No Drawings.]

A.D. 1866, August 21.—N° 2144.

NEWTON, William Edward.—(*A communication from the Excelsior Nail Company.*)—The object of this invention which relates to that class of nail making machinery adapted for cutting nails from narrow metal plates, is the application to such machines as have but one heading tool or die, of an automatic feeding apparatus, which draws back the plate to clear the movable cutter, lifts the plate clear of the fixed or bed cutter, turns it over after each successive cut, and moves it forward in advance, so that the portion intended to form the next nail is brought between the cutters. One end of the nail plate is held by a pair of nippers attached to the end of a cylindrical rod, which turns the plate, and by passing between a pair of grooved feeding rollers, it advances the plate intermittently by means of a ratchet on the spindle of one roller, and a pawl operated by the vibrations of the feeder frame. The nail plate and nippers slide through a turning tube, which has adjustable nose pieces that form an exit passage for the plate; this tube is mounted in the feeder frame, directs the plate to the cutters, and lifts and turns with it after every cut. Means are provided for adjusting the feeding apparatus, so that the plate may be presented to the cutters at the proper angle for giving the tapering form to nails of different sizes.

[Printed, 1*s*. Drawing.]

A.D. 1866, September 11.—N° 2334.

PAGET, Frederick Arthur.—(*Provisional protection only.*)—The object of this invention is the so constructing screw-bolts and rivets employed for connecting parts of structures and machinery, as to render them more capable of resisting the impulsive strains to which such parts and bolts are liable; and this is effected by making bolts or rivets longitudinally hollow in the shank, and solid at the screwed part, thereby equalizing the strength and giving to the shank the power of extension, whereby the effect of the strain is distributed over a whole length of metal of uniform strength, instead of being confined to the threaded part, as is the case when ordinary bolts are used, which generally break off close to the nut before the shanks will yield. These bolts when employed for securing armour plates to vessels are to be made by preference of steel, and one or more of the steel cup-washers described in a former patent granted to this inventor, and dated May 29, 1865, No. 1473, are to be placed under the heads and nuts of such bolts, or under the heads of the rivets employed for connecting the plates which form the inside lining or skin of the ship. These bolts and steel cup-washers are adapted for use on board steam vessels for securing the cheese couplings of screw shafts, also for connecting the parts of steam hammers, and amongst other purposes to the construction of railways.

[Printed, 4*d*. No Drawings.]

A.D. 1866, September 18.—N° 2392.

THOMPSON, John.—This is an invention of apparatus applicable for cutting and polishing screw nuts, and capable with modifications of operating in like manner on the heads of bolts and other articles. Mounted in the machine is a horizontal chuck or table plate which rotates on a vertical axis intermittently after each stopping interval, one sixth of a revolution. Upon the face of this table plate are circumposed at divisional distances a series of six socket bearings, carrying spindles whereon the nuts are fixed, the operating cutting and polishing tools being arranged and fixed to the frame work with limited liberty to slide. Whilst the nuts are being operated upon by the facing, chamfering, and the polishing tool or instrument, the spindles which carry them for the time being all rotate in one direction, the nuts and spindles passing on to the different tools in succession, and after they by turns move on from the last tool and stop, the motion of the spindles is reversed for the purpose of unscrewing and removing the finished nuts, which as they come round are held by a locking instrument whilst the spindles turn back. During the next two stopping intervals fresh nuts are placed upon the spindles, which are then held stationary by spring catches, and in turn they are moved round to the tools. The first tool or cutter which faces the nuts is carried in a slide rest moved to and fro by a screw; the second tool is set to chamfer the corners off the nuts by turns as they come round, and the third tool or polishing instrument consists of an endless emery band which passing round pulleys is brought into contact with the surface of the nut. The locking instrument is a bolt which is projected against one of the sides of the nut to prevent its turning whilst the motion of the spindle is in the reverse direction. The operations are performed simultaneously in succession on separate nuts, and the attendant is engaged screwing fresh nuts on the two spindles, which for the time being are at rest.

A modification of the machine adapted to other purposes is described.

[Printed, 10*d*. Drawing.]

A.D. 1866, October 1.—Nº 2524. (* *)

CHALMERS, James.—" Improvements in bolts and washers." This invention has for its object to prevent the breaking of bolts by sudden concussions, such as are caused by the impact of shot on armour plates attached to ships of war or fortifications. As bolts subjected to sudden concussions are liable to break at the thread, where the cross section is reduced, it is proposed to increase the size of the bolt and reduce the section of the shank so as to be equal to the section at the bottom of the thread, in the following manner :—" Taking a bolt, say, 2 feet in length and " 2½ inches in diameter, the area of the cross section would be " about 5 inches, and allowing for depth of thread, one-eighth of " an inch, the area of cross section at bottom of thread would be " about 4 inches, hence the shank of the bolt would be reduced " one inch." This reduction it is proposed to effect by making " a slot through the centre of the shank, commencing at, say, " one inch from the termination of the screw thread, and ending " about an equal distance from the inner part of the head of the " bolt. This slot, to facilitate making and lessen cost," it is proposed to form as follows :—" The iron of which the bolt would " be made would be a half round (or nearly half round) bar, two " pieces of which, of the length required," would be placed with the " flat *sides facing* each other, with a piece of iron of the same " *breadth* and ½ inch thick or so between them at each end,

" which when welded would make the solid part of the bolt,
" leaving the space between to form the slot. This slot when the
" ironwork was finished would be filled with a slip of wood or
" iron driven in tight with marine glue or some other adhesive
" substance to secure it. A bolt thus formed could be of the
" same diameter throughout its entire length, thus filling the
" hole and making a good fit. For washers for armour plate
" bolts or where sudden concussions are expected," it is proposed
" to use next the skin of the ship or surface to be acted on a
" wooden or other cushion washer of tough but not too hard
" materials of, say, from half inch to one inch in thickness, then
" an iron washer of, say, a quarter or half inch thick, having its
" outer edge pressed or turned down, say, a quarter inch, so as to
" surround and embrace the cushion washer in order to prevent
" its falling out in case of its being fractured."

[Printed, 8*d*. Drawing.]

A.D. 1866, October 12.—N° 2636.

COOKE, Henry John.—(*Provisional protection only.*)—This invention, relating to an apparatus for making bolts, rivets, and nut-blanks, consists of a machine employing a circular table or horizontal die holder carrying dies arranged radially in rows at divisional distances, and moving round a vertical axis at intervals, each time or move being such a portion of a revolution as corresponds with the divisional position of the rows of dies, which are thus brought by turns to rest in succession, first directly beneath the end of an iron guide or shoot, down which the pieces of iron, cut from heated rods by an appropriate cutting apparatus above, fall directly into position to be forced by hammers, one into each of the dies as the rows in succession come round. The next move brings the dies so furnished by turns directly beneath the heading tools, which are arranged to correspond with the dies, and to descend and form heads upon the bolts or rivet pieces. When the heading tools rise, a set of jumpers enter through the bottom of the dies from below, and drive out of the dies the finished bolts or rivets, which are collected and drawn off the table by a self-acting rake. The revolving die holder or table rotates on friction rollers. When the machine is arranged for making nuts a change of tools is necessary.

The heading tools can be worked by a steam cylinder and piston, to which the heading tool holder, which slides up and down in vertical guides, is attached; or the heading tools and hammers may be operated either by compressed air or hydraulic pressure.

[Printed, 4*d*. No Drawings.]

A.D. 1866, October 13.—N° 2651.

GREENWOOD, THOMAS.—(*Provisional protection only.*)—The object of this invention is to avoid the defects of the treenails ordinarily employed to secure chairs to railway sleepers, which it is stated are either frequently split by the subsequent expansion of the treenails, or, if the latter are expanded by previous exposure to the weather, their holding power becomes impaired.

The head or conical part of the improved treenail is turned to fit the hole in the chair, and the shank is made parallel and oval in cross section; and, instead of being finished with a smooth surface, the cutting tool and apparatus employed for the purpose leaves on the surface of the treenail a shallow screw thread. These treenails are to be inserted and driven into the holes with their major diameter in a line with the grain of the wood of the sleeper, the softer material of which becomes embedded in the screw threads cut in the hard wood of the treenail, causing the latter to hold in the sleeper without any tendency to split it.

[Printed, 4*d*. No Drawings.]

A.D. 1866, October 15.—N° 2660.

GILES, JOHN.—This invention relates to the manufacture of chair nails, coffin nails, pins, shoe nails, tacks, and articles employed for similar purposes. The tacks are produced by a process of casting, and the invention consists in the nature of the moulds employed, which instead of being of sand according to the ordinary method of casting metals, are composed, one part of iron in which the heads are cast, and the other part of sand wherein are cast the shanks.

By this mode of casting the expense of labour for preparing a fresh head mould in sand for every casting is saved, and the heads being cast in the smooth iron mould have a much better finish, and when made of iron are hardened as in a chill.

[Printed, 4*d*. No Drawings.]

A.D. 1866, October 19.—N° 2706.

BROOMAN, CLINTON EDGCUMBE.—(*A communication from Victor Palyart.*)—This invention relates, first, to the construction of "*safety pins*, nails, or tacks to be applied to caps or capsules

" for bottles and other receptacles, and to other purposes; and,
" secondly, to an apparatus to be employed in inserting them
" when fixed to caps or capsules, into the heads of corks in
" bottles and similar receptacles. The improved pins, nails, or
" tacks are in the form of a lance, an arrow, or an anchor; they
" may advantageously be substituted for all ordinary nails, and
" they are applicable to caps or capsules for bottles, vases, jars,
" and other similar vessels; these pins, nails, or tacks may be
" round, triangular, or other desired shape in section. In employing them as nails or means of attachment they present against
" their withdrawal a projection or projections towards their end
" or at their middle, or at regular or irregular distances for their
" whole length, in the form of a cone, or of numerous projecting
" points or pins, or otherwise; they may be of uniform thickness,
" but they are preferred to be thicker towards the top." A manifold variety of the pins and nails are exhibited in the drawing.

Describes and represents apparatus adapted for inserting the pins and nails when fixed to caps and capsules, into the heads of corks after the latter are driven in the bottles

[Printed, 10*d*. Drawings.]

A.D. 1866, October 30.—N° 2810.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Charles Henry Perkins.*)—This invention relates to a mode of treating plates of sheet iron preparatory to their being coated with zinc or galvanized, and also for manufacturing such plates in imitation of Russia iron, the same process of preparation being applicable to nails and screws intended to be colored or coated with metal to prevent oxidation, the effect being, the removal of the scale or metallic oxide which exists on the surface of the sheet iron after the ordinary process of manufacture. The first object in the preparing process is the removal of the oxidized scale; this is effected in various ways so as to brighten the surface of the plates, preferably by the use of the revolving rubbing bed commonly employed in working marble or freestone, or reciprocating rubbers may be employed with sand and water. When free from scale and bright, the sheets are placed in an oven heated to 500° Fah., at which point the deep blue colour which distinguishes Russia iron is obtained.

In the preparation of plates for coating or galvanizing, the process *consists* in first packing a number of plates into an iron flask along with a sufficient quantity of iron turnings or chips, which are interposed between and about the plates. When the flask or box is closed and the joints made up with clay, it is placed in a furnace, in which such a high degree of heat is maintained, that the flask and its contents can only bear without fusion. The average time of remaining in the furnace is twelve hours, during which interval the scale is reconverted into pure iron, and when cooled and removed, the surface of the plates have the dull color of unpolished silver, which by passing between polishing rollers or by hammering, is rendered bright and smooth. Other plans for treating and blueing plates by means of heat are described.

[Printed, 4*d*. No Drawings.]

A.D. 1866, October 31.—N° 2821. (* *)

WILLIAMS, HENRY HEADLY.—(*A communication from John Gregory.*) — (*Provisional protection only.*) — "Improvements in " fastenings and backing for armour plates." "This invention " relates, firstly, to fastenings for armour plates, and consists " mainly in constructing the bolts of wire rope. The outer end " or head of the wire rope bolt, which fits into the armour plate, " is made conical by driving a metal conical piece into the centre " thereof, and this conical head is then covered in a mould or " otherwise with a cap of malleable cast or wrought iron, or other " metal. When this wire rope bolt is driven tightly up, the " inner end which passes through the inner skin of the ship or " other structure is spread out to form an inner head by driving " in a metal conical piece, the ends of the strands of wire being " lapped over and round the end of the cone; the inner end is " then tightly clipped by a split nut or a nut made in two pieces " and formed with internal projections to take between the strands " of the rope; an outer nut is then screwed over the split nut, " the projections on which prevent this nut from turning with the " outer nut; a washer is fitted between the outer nut and the " inner skin or the inner end of the bolt may be otherwise " secured."

And, secondly, to backing for armour plates. This part of the invention "consists in backing armour plates with wire of any " desired form or shape, all the spaces or interstices being filled " in with dissolved gutta percha and papier mâché, or other suit- " able material. It is preferred to make this wire backing in " *blocks to fit tight* between horizontal angle irons placed between

" the armour plating and inner skin to prevent the wire backing " spreading out, and the blocks of wire are immersed in a bath " of gutta percha mixed with papier mâché, or in a bath of other " suitable material; hydraulic pressure may be employed in this " process."

[Printed, 4*d*. No Drawings.]

A.D. 1866, October 31.—N° 2826.

PATTERSON, John.—(*Provisional protection only.*)—The object of this invention, relating to a mode of fastening screw bolts and nuts, is to prevent the nuts working loose, when subjected to shocks and vibrations after they have been tightened up. To this end a thin plate or washer sufficiently large in diameter to project slightly beyond the sides of the nut is employed, and placed in the usual manner under the nut, and when the latter has been finally tightened up, by means of a chisel and hammer, a portion of the projecting edge of the washer is bent up against one of the flat sides of the nut, whereby the turning or loosening of the latter, so long as the washer remains fast, is prevented. In cases where bolts are inserted within a reasonable distance of each other, one thin plate may be made to serve two or more bolts, the plate being perforated with holes corresponding to the size and distance apart of the bolts, the unturning of the nuts when tightened up being prevented, by turning up the corners of the plate in the manner described. To prevent the turning of a single washer, its under side may be ribbed or burred.

[Printed, 4*d*. No Drawings.]

A.D. 1866, November 6.—N° 2876.

BENTALL, Edward Hammond.—This invention, relating to the manufacture of screw nuts from cold bar iron, consists of a series of machines severally designed to perform by turns one of the successive operations required in the process, viz., cutting up the nut iron bars into pieces of uniform size; drilling the central hole for tapping; tapping the holes; and facing and finishing.

For cutting up the bars two machines are devised; one is adapted for cutting pieces, to form nut blanks of ordinary thickness, by means of shears or cutters, which at every stroke sever a row of pieces from the ends of a number of bars fixed side by side on a feeding carriage, which obtains its requisite intermittent motion from a screw. The other machine, designed for cutting nut blanks of more than ordinary thickness, operates by means of a series of cutting tools mounted on a sliding carriage, and made to traverse to and fro crosswise over a series of bars of nut iron clamped side by side upon the machine bed, the tools rising when the action is reversed for the backward movement, and after each succeeding stroke descending lower so as to follow the cut; arrangements are made for lubricating the bars.

The machine adapted for drilling operates by means of a circumposed series of drills concentrically arranged round a vertical shaft, whereon is fixed a spur wheel, which gives motion to all the drills by engaging with a series of pinions, carried, one on each drill spindle. All the drills operate simultaneously, and those parts of the apparatus which hold the nut blanks are supported on a table capable of rising, so as to keep the blanks up to the drills whilst the latter perforate. Arrangements are made for lubricating the drills.

The tapping machine is a modification of the drilling machine, the taps being so fitted than when the nut is threaded, they are easily withdrawn whilst the machine is at work, from the drill spindles, which, by an alteration of the gearing, are revolved at the requisite slow speed. The machine, as exhibited and described, is adapted for working with forty spindles.

The facing and finishing is performed by a lathe especially adapted to the purpose, having arrangements for accommodating nuts of various sizes. Two cutters, one for roughing and the other for finishing, are employed; these are fixed in a clamp carried by a transverse slide, which is mounted on a saddle, made capable of sliding in grooves in the lathe bed by means of a rack and pinion.

[Printed, 3*s.* 10*d.* Drawings.]

A.D. 1866, November 10.—N° 2942.

TONGUE, John Garrett.—(*A communication from Jacob Russell, Henry Townsend McCoun, James Lemuel Romer, and Thomas Townsend Buckley.*)—The object of this invention, relating to machinery for cutting and heading nails, is by the use of movable cutters to obviate, in order that each successive cut shall produce a nail having the requisite tapering form, the necessity for turning or reversing the narrow nail plates from the ends of *which the nails* are transversely cut. To this end, in addition to their ordinary clipping action, the cutters oscillate about a perpendicular axis, so that the cutting angle in relation to the position of the nail plate, is changed every successive cut. The nail plates moved by chains or cords and weights, and held by dogs, are fed along a table, following each other in the direction of the cutters. The bottom cutter is fixed to a main oscillating frame which carries the principal operating parts, and the top cutter is secured to a block on a rocking beam, which is mounted on the frame and oscillates therewith. After each cut in succession the plate is advanced to a spring gauge, and the blank piece cut off is held by the springs whilst a nipper rod comes forward, which catches the blank near the bottom edge and turns it over on the "flat" into position for heading. The nipper rod is combined with a pair of grippers, which hold the blank whilst one of the headers comes forward to form the head, after which the grippers relax and the finished nail falls. The two headers act by turns upon the widest end of the blanks, which as the cutters oscillate are cut alternately from the opposite edges of the plate.

[Printed, 10*d*. Drawing.]

A.D. 1866, November 13.—Nº 2969.

SCHOLEY, AUGUSTUS.—(*Provisional protection only.*)—This invention, relating to the manufacture of nails and similar fastenings, "consists in making them three-sided and tapering gra-
" dually from the head to the point, each side, however, in lieu of
" being flat, is hollowed or grooved the entire length, or any
" portion thereof, the three corners or angles presenting sharp
" ridges somewhat after the fashion of a bayonet. In lieu of
" having a laterally projecting head this part of the nail or fasten-
" ing is produced by expanding rather more abruptly the upper
" end of the nail, so that when driven the extreme end only of the
" nail will be visible. The peculiar nails above described may be
" manufactured in various ways according to the purposes to
" which they are to be applied; for example, when cast nails are
" applicable they may be cast in the form described, and when
" wrought nails are required they may be shaped by forging in
" swages, dies, or otherwise."

[Printed, 4*d*. No Drawings.]

A.D. 1866, November 21.—Nº 3058.

NEWTON, ALFRED VINCENT.—(*A communication from John Oliver Reilley and Alexander* Wiley.)—This invention relates to machinery adapted for making railway and other spikes, and rivets or bolts, the levers which operate the head-bending and the pointing dies, being capable by simply turning their pivotted arms, of disconnection with their operating cams, so that the machine may be adjusted at pleasure to make either hook-headed or plain spikes or rivets. The rod is fed forward to a gauge which determines the length of the spike or article, the end being gripped between a horizontal moving die and its companion, which is fixed to the machine frame, the moving die being moved to-and-fro respectively by a cam and the reaction of a spring. A cutter, sliding in guides by the side of the fixed die, is forced forward by a cam to sever the spike piece from the rod. A pointing die mounted in vertical guides above the horizontal die, is operated by a rocking lever, which obtains motion from a cam; the pointing die acts in conjunction with the under dies to complete the formation of the point, and a die carried by another rock lever strikes down or bends over the head when hooked spikes are being produced, and in the case of ordinary headed spikes or bolts, the heading die, which slides in horizontal guides in the centre of the machine, is advanced by a cam fixed on a transverse shaft, and returned by the reaction of a spring. When finished the spikes and articles are forced out of the dies by an ejector, which is projected by a cam and withdrawn by a spring.

[Printed, 10*d*. Drawing.]

A.D. 1866, November 24.—Nº 3095

BASS, William. — This invention relates to machinery for making nails, being a modification of the machine described in the specification of Letters Patent granted to G. T. Bousfield, and bearing date January 21, 1862, No. 156. The metal out of which the nails and articles are made is formed into a coil and heated in the horizontal flue of a furnace, whence it is by degrees drawn out by a pair of vertical reciprocating quadrants, each having a corresponding groove in the circumferential part of its periphery, varying in width and depth in conformity with the desired shape of the finished nail. Thence the rod passes "to a
" lesser pair of quadrants placed horizontally or at an angle to
" suit the section of the article to be produced; these also have a
" groove in their edges, and are moved backwards and forwards,
" but do not necessarily act on the rod in its forward motion;
" from these the rod passes into or between a pair of dies, where

" it is firmly held while a hardened iron or steel cutter, carried " by a transverse sliding bar, comes forward and cuts off the " length of rod required to form a nail blank, and at the desired " angle to form the point of the next nail, a sufficient length " projecting beyond the end of the dies to form the head of the " nail. The use of the smaller quadrants in their backward " motion when the nail blank is receding is to push the part of " the severed rod left on one side by the slanting action of the " cutter into the centre and to draw down the iron ready to be " operated upon by the larger quadrants. The dies receive a " lateral intermittent motion from a cam or its equivalent, but " they remain stationary while receiving the rod and during its " severance. When the blank is cut off they move along a slide " bed to one side where they are again stationary, and by means " of an excentric on the fly wheel shaft a block having the desired " form for the head of the nail sunk in it is pressed against the " projecting nail blank to form the head; this being completed, " the dies move towards the centre of the machine again, one " jaw, however, being held back by a suitably arranged catch to " allow the nail to fall out." When the finished nail has fallen, the jaw is released, and it is moved forwards by means of a spring. The nail produced may "be made to any desired shape, " by simply cutting the grooves in the segments to the form " required."

[Printed, 1*s.* 10*d.* Drawings.]

A.D. 1866, December 10.—N° 3247.

SMITH, William Ford, and COVENTRY, Arthur.—This invention relates to apparatus for manufacturing tool holders and cutters, and for grinding or sharpening cutting tools employed in lathes, planing, and other machines employed in cutting and shaping metals.

The tool holders are adapted for cutters formed of tempered bar steel of uniform section, and fixed in the holder at a cutting angle of 45° by means of two steel set screws, the point ends of which are slightly convex and furnished with a series of concentric grooves, all made by a tool simultaneously with cutting edges that firmly hold the cutting tool, which is set to a line made on the holder to indicate the proper working angle. Ordinary holders are rectangular in section, but for holders of tools and cutters employed for screw cutting, the stem or shank of the holder is round, in order to be more capable of adjustment to the angle required; the cutting tool is held by a bolt transversely slotted through its axis, the tool passing through the slot is fixed by screwing up the bolt nut. The steel employed for screw cutting tools is not rectangular, being broader on one edge than the other.

Describes the various devices and tools used in making and fitting the tool holders, and amongst other things the mode and appliances employed in severing the pieces of steel from the bars to form cutters, and a chuck or clamping apparatus to be used in drilling and countersinking the holes for the set screws, the holders being first forged roughly and then shaped to the finished form by being driven whilst hot into suitable dies.

The grinding apparatus consists of a moving tool holder, which slides the tool across the face of the grindstone whilst in contact therewith.

[Printed, 1*s*. Drawing.]

A.D. 1866, December 10.—Nº 3248.

BROOMAN, Clinton Edgcumbe.—(*A communication from Hippolyte Parpaite.*)—(*Provisional protection only.*)—This invention relates to the making of nails or studs, adapted for upholstery, harness and other purposes, and to the apparatus employed in the manufacture. These nails are made out of wire or rods of copper or other metal, which passes in the machine through a succession of operations by means of suitable tools and operators after the manner of nail making machines actuated by cams and levers, being first subjected to a double vertical pressure between two tools with hollow faces, which flatten the part intended for the point, a double horizontal squeezing between two tools, which by acting simultaneously round the flattened part of the rod, partly form a head for the stud, and hold it, as between dies, whilst the head is stamped by a rammer, which is hollowed out to correspond with a boss formed on the tools, either round, conical, or otherwise. The rammer is actuated by a cam and springs. "The double horizontal punching action is effected by " two tools which cut off or separate the stud from the wire or " rod and taper the point. The portion of these tools which " tapers the point is in the form of cutting matrices, being " hollowed to correspond exactly with the point to be produced " The other portion consists of two cutters which cut through

" the wire or rod and separate the stud. The tools are formed " with inclined recesses to facilitate the disengagement of the " parts. The finished stud may be released by a lever or other- " wise." The wire or rod is fed into the machine by any convenient arrangement.

[Printed, 4*d*. No Drawings.]

A.D. 1866, December 18.—N° 3328. (* *)

LAKE, WILLIAM ROBERT.—(*A communication from Arlon Man Polsey.*)—" Improvements in nails and in machinery for manu- " facturing the same."

" The first part of the said invention relates to an iron or steel " nail in which the head is left substantially in that condition of " softness produced by hot working, while the shank is left in " that condition of hardness, smoothness, and rigidity which is " produced by rolling it substantially throughout while cold; " nails produced by this method are superior for many purposes " (especially for shoeing horses) to any others ever before produced, " because the whole shank of the nail is rigidified and will not " readily bend in any part under the action of a hammer, as nails " will often do when left in the condition produced by hot work- " ing, especially when the metal is of good quality; moreover, " the cold rolled shanks are free from the scale produced by hot " working, and have a smoothness superior to that resulting from " any other process, which smoothness facilitates the driving of " the nails. The softness of the head of this improved nail " facilitates its fitting into such grooves as are made in metal shoes " for animals, the head yielding and 'up-setting' so as to fit and " bear firmly in its bed.

" The second part of the said invention relates more particularly " to mechanism for producing these nails from the blanks, and " consists in so arranging and operating each pair of a series of " pairs of die rolls, with reference to the other pairs of the said " series, that the nail blank shall have its sides and edges acted " on alternately without turning the said blank on its axis, and " that the nail shall be passed onward by each pair of die rolls, " and shall be by them delivered to the action of the next suc- " ceeding pair, by which pair it is seized before being released by " the preceding pair, and so on through the series of pairs of rolls. " Where the article to be drawn and shaped is substantially

“ rectangular in cross section, each pair of rolls is placed at right
“ angles to the pair which next succeeds in the drawing and
“ shaping operation ; but this invention is not confined exclu-
“ sively to such right-angled arrangement, for if the article to be
“ drawn and shaped is of other cross sectional form, the pairs of
“ rolls may be placed at such angles with relation to the other
“ pairs of the series as will act successively on the different sides
“ or faces of the article, it being sufficient to illustrate the said
“ invention that two or more pairs of die rolls shall be placed at
“ angles with each other, the said rolls having the necessary rela-
“ tion to the form of the article to be drawn and shaped. The
“ said die rolls act to positively pass or feed onward from one
“ pair to the other the article in the manner before stated, and
“ operate on the different faces of the said article to cause it to
“ approximate more and more nearly to the shape desired at each
“ successive passage through the pairs of die rolls, and without
“ turning the said article on its axis as has been heretofore prac-
“ tised in drawing and shaping by successive passes through
“ series of die grooves made in one pair of rolls.

“The third part of this invention relates to straightening,
“ pointing, and finishing that class of horse-shoe nails which are
“ produced by cutting each blank from a sheet of metal and
“ drawing down the shank of the said blank to form and toughen
“ the point by means of a series of roller dies or die grooves. The
“ mechanism for accomplishing this may be employed either
“ separately or in combination with the rolling dies already
“ described in the second part of this invention. As the action
“ of these dies leaves the blanks more or less bent and somewhat
“ imperfect at or near the points, they require a slight trimming
“ and a setting of the finished point to give it a sort of chisel
“ termination. This part of the said invention consists chiefly in
“ effecting the straightening of the edges of the nail by the action
“ of rolls and moveable blocks, and in combining with these rolls
“ a guide or throat piece, through which the nails are fed from the
“ rolls, the action of this guide in connection with the action of
“ the rolls straightening the broad faces of the nail. This part
“ of the said invention also consists in the mechanism for cham-
“ fering the nail at the point, in combining with the straightening
“ and pointing mechanism a cutter to trim the end of the said
“ nail, and in so arranging certain straightening and pointing
“ mechanism with reference to the roller dies which roll the blank

" into general shape, that the nails are automatically delivered " from the die rolls to the straightening mechanism."

[Printed, 1*s*. Drawings.]

A.D. 1866, December 19.—N° 3334.

BODMER, Rudolph.—(*Provisional protection only.*)—This invention, relating to a method for securing the nuts of bolts, is especially intended to be applied to bolts used in jointing railway rails by means of fish plates, and is also applicable in the construction of iron bridges, girders, and other structures liable to vibration, " consists in splitting longitudinally the whole or a " portion of the screwed part of the bolt, and after the same has " been put in its place, and the nut drawn up as tightly as may " be considered desirable, introducing and driving into the slit, " either in the direction of the axis of the bolt or transversely, a " wedge representing a very slighty inclined plane, so as in a " trifling measure to expand the two halves or parts of the bolt " projecting beyond the nut, and thereby to prevent the nut from " becoming loose through the vibrations caused by the passing of " trains over the rails, or from other causes."

[Printed, 4*d*. No Drawings.]

A.D. 1866, December 28.—N° 3410.

WATKINS, Francis. — This is an invention of machinery adapted " for cutting, punching, and shaping metals for screw " nuts and like articles."

" On the main shaft of the machine is a driving wheel, which " gears into the spur wheel and drives another shaft, on which " are keyed two cams actuating two slides, which carry compound " punches, the solid punch carried by one slide working within a " ring punch carried by the other; the machine is double-acting, " and there are similar tools at each end of the slides. The slide " which carries the ring punches actuates two other slides opposite its two ends by means of rods fixed to the first slide, and " passing through the others, the rods have adjustable nuts upon " them, and allow a certain amount of independent motion in the " end slides, which also carry ring punches similar to those carried " by the slide which actuates them. Between the ends of the " central slides and the outer slides, dies or forming boxes in " which the articles to be made, are formed and secured to the

" frame of the machine by means of bolts. The machine being " set in motion, a bar is placed between the forming die or box, " and the ring punch of the central slide which forces off a piece " and drives it into the forming die or box against the ring " punch of the outer slide which forms the bottom of the box, " and at this time rests against an adjustable screw top, and there " is an india-rubber or other spring interposed between the slide " and the stop, whose use is to prevent the breaking of the " machine from an undue strain should there be an excess of " metal forced into the forming die or box, or from other causes. " A continued advance of the central slides carries the blank into " the die box until it is firmly compressed; at this time the solid " or piercing punch of the central slides, which has continued to " advance with the other central slide, is suddenly caused to " advance still further, and passes through the blank into the " hole in the opposite ring punch, driving before it a plug of " metal equal to its diameter. After the formation of the hole, " the piercer is withdrawn into the mouth of its ring punch, " which likewise begins to recede, leaving the finished blank in " the forming die. When the central slides have withdrawn a " distance, determined by the nuts on the ends of the rods, the " outer slide is dragged after them, and forces the finished blank " from the forming die box; whilst this is being done, the tools " on the other end of the slides are beginning the operation of " cutting off the blank, the making of which is in all respects " similar to that already described."

[Printed, 1*s*. Drawings.]

A.D. 1866, December 28.—Nº 3412.

WATKINS, FRANCIS.—This is an invention of machinery adapted "for shaping and forging metals into rivets, bolts, screw " blanks, and like articles." The machine described operates by means of two separate sets of apparatus, disposed respectively at the opposite sides of the machine, and both actuated by a main cam shaft. Each set consists of an intermittently revolving disc or die holder, a pair of feeding rollers, cutting off shears or cutters for severing the rivet or bolt pieces from the heated rods, and a heading tool or die carried by a reciprocating slide. Each of the die holders carries a series of dies fixed respectively at divisional distances in their peripheries, and the rods are fed by the feeding rollers through a fixed cutter directly into the dies in succession, which severally act as cutters when the die holders move, and carry the cut off pieces into position directly opposite the heading tools. These tool dies are fixed in horizontal slides, which are advanced by cams after every successive movement of the die holders, in time to form heads severally on the rivet pieces brought round in succession by the dies. After the heads are formed, the finished rivets or headed blanks are thrust gradually out of the dies by a series of sliding bolts, one to each die. These bolts slide in radial grooves formed in the interior of the die holders, their back or inner ends resting upon the periphery of a fixed eccentric cam. The precise position of the die holders after every successive move is adjustable by tapering plugs, which project one from the face of each heading die slide, advancing therewith, and entering regulating holes, made in the periphery of the die holders respectively one beside each die.

A furnace is described especially constructed for heating the metal rods.

[Printed, 2*s*. 4*d*. Drawings.]

APPENDIX.

A.D. 1844, April 10.—Nº 10,142.

LENOX, George William, and JONES, John.—This invention relating to the manufacture of sheaves and shells for blocks, and bolt-rings or washers, for the use of shipwrights and engineers, has for its object the "comparatively cheap" production of such articles by carefully casting them of iron in the usual way, and afterwards for the purpose of giving to the cast metal the necessary amount of strength, toughness, and malleability, submitting it to a proper annealing process. The drawing exhibits a single sheaved and a double sheaved block, the shell or frame of each being in one casting combining lightness and strength, to effect which, due regard must be paid in the formation of the models to the distribution of the metal, in order that lightness in some parts and sufficient strength in others be maintained, especially at the upper part or neck, whereto the lower or swivelling end of the hook is attached by means of a nut, which is screwed on to the hook end and cross pinned. The central pin or axis for the sheaves is made of iron case-hardened; it has a half-round head at one end, and is secured in its place by a nut at the other. The same process is adopted in the production of bolt-rings or washers, the model patterns for moulding them having the finished form. The after process of annealing is to be the same as is ordinarily practised in the annealment of objects of cast iron, by surrounding them "on " all sides with Cumberland or Lancashire iron ore . . . . . and " submitting the articles to a red heat till properly annealed, and " when the same are cooled down, they will be found tough and " strong." It is preferred that blocks thus made should have a coating of zinc.

[Printed, 10*d*. Drawings.]

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Bolts, &c.—*cont.*

and spikes; Grinding bolt heads; Heading bolts; Heads and parts of nails and bolts, forming, &c.; Hollow or tubular bolts; Jagged or barbed bolts, &c.; Metallic alloys and compositions for making and coating bolts, &c.; Pointing nails, bolts, &c.; Polygonal bolts; Railway pins, spikes, bolts; Stay bolts; Split bolts, &c.; Steel bolts.

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- Potts and Cox, 258.
- Scott, 262.
- Nelson, 264.
- Davies (*McNally*), 336.
- Kennard, 341.
- Carter, 363.
- Thompson, 388.
- Smith and Coventry, 398.

Machines for twisting nails, spikes, bolts. *See* Twisting nails, &c.

Machines worked direct by steam. *See* Working bolt and nail machines direct by steam.

Magnetic holders for screws, nails, tacks, &c., whilst being driven:
- Droop, 303.

Marine bolts. *See* Bolts for marine purposes; Bolts for securing armour plates; *also* Insulating marine bolts.

Metallic alloys and compositions for making and coating bolts, screws, nails, nuts, &c. *See also* Coating, tinning, &c.:
- Kerr, 4.
- Cutler, 52.
- Hood, 70.
- Onions, 91.
- Newton, 105.
- Chenot and Chenot, 147.
- Newton (*Poleux*), 153.
- Parkes and Parkes, 177.
- Hiler, 184.
- Wigzell, 255.
- Parkes, 261.
- Bailey and Bailey, 266.
- Searle, 267.
- Bowser and Bowser, 294.
- Crocker, 300.
- Fowler, 331.
- Simons, 374.

Moulding and moulds for casting nails, screws, spikes, nuts, washers, &c. *See also* Casting and cast nails; *also* Casting and cast screws; Casting nail and bolt heads; Cast steel bolts, annealing, tempering, &c.; Casting dies and cutting tools:
- Ashton, 3.
- Maullin, 8.
- Holmes, 46.
- Warren, 64.
- Onions, 64.
- Lenox and Jones (*Appendix*), 404.
- Warren, 79.
- Onions, 91.
- Warren and Walker, 94.
- Henn and Haddon, 139.
- Carron, 182.
- Moate (*Gibbs*), 205.
- Wigzell, 264.
- Giles, 391.

Nails, and the processes employed in making them, are classified and placed under the following heads, viz.:—Boot and shoe pegs, nails, &c.; Brass-headed nails;

Nails, &c.—*cont.*

Casting and cast nails; Casting nail and bolt heads; Chisel-pointed nails, &c.; Coating, tinning, &c.; Coffin nails; Copper and brass nails; Fluted or grooved nails; Heading nails; Heads and parts of nails, &c.; Horse-shoe nails; Jagged or barbed nails, &c.; Lath nails; Metallic alloys and compositions for making and coating nails, &c.; Nail-cutting machines; Nail iron, preparing, rolling, &c.; Nails, machines for forging, compressing, &c.; Nail shanks; Nails of malleable iron; Nails and spikes for clinching; Ornamental heads of nails; Pointing nails; Rose-headed nails; Roughs; Sheathing nails; Slitting nail iron; Spiral nails; Split bolts, nails, &c.; Trigonal nails; Upholsterers nails; Wire nails. *See also* Spikes.

Nail-cutting machines:

Clifford, 5.
Clifford, 6.
Guppy, 7.
Willmore and Tonks, 11.
Dyer, 12.
Dyer, 13.
Dyer, 15.
Todd, 17.
Church, 18.
Ecroyd and Wilks, 21.
Ledsam and Jones, 23.
Church, 28.
Prosser, 37.
Berry, 62.
Mabley, 66.
Walker, 71.
Vieyres, 72.
De Meckenheim, 80.
Goose, 86.
Coates, 87.
Danks and Walker, 103.
Brooman, 112.
Bousfield, 123
Latour and Latour, 128.
Goose, 130.

Nail-cutting machines—*cont.*

Newcomb, 160.
Parkes, 174.
Newton, 189.
Campbell and Worstenholm (*Allen*), 215.
Reynolds (*Coggshall*), 222.
Newton (*Hoard and Searle*), 231.
Massiaux, 254.
Bennett, 257.
Gorse, 267.
Quinard, 270.
Southwood, 279.
Townsend (*Sargent*), 282.
Barclay, 285.
Wickens (*Wickersham*), 289.
Haseltine (*Sweet and Sweet*), 290.
Southwood, 296.
Parkes, 731,
Bush (*Wiggin and Hoard*), 321.
Newton (*Wickersham*), 333.
Wadsworth and Wadsworth), 343.
Robinson, 345.
Fontainemoreau (*Courvoisier, Dusis, and Bigoy*), 353.
Davis (*Hunt*), 363.
Sadler, 368.
Lucas, 384.
Newton (*Excelsior Nail Co.*), 387.
Tongue (*Russell, McCoun, Romer, and Buckley*), 395.

Nail-iron, preparing, rolling, cutting, compressing:

Dawbeney, 1.
Clifford, 5.
Clifford, 6.
Spencer, 9.
Hodgetts, 10.
Bell, 11.
Dyer, 13.
Finch, 13.
Gilchrist, 16.
Todd, 17.
Church, 18.
Tyndall, 23.
Hancorne, 26.
Church, 28.
Berry, 30.
Fuller, 32.
Cordes, 35.
Slocum, 36.
Stocker and Downing, 40.
Collier, 46.
Poole, 54.
Stocker, 56.
Walker, 71.
Hall, 71.
Dorr (*Miller*), 74.
Collier, 76.
Robertson, 76.
De Meckenheim, 80
Lambert, 84.
Poole, 85.
Hinks and Nicolle, 91.

Nail-iron, &c.—*cont.*

- Berry, 97.
- Rothera, 100.
- Arrowsmith, 101.
- Griffiths, 101.
- Fontainemoreau, 113.
- Lander, 116.
- Hill, 120.
- Hopper, 125.
- Goose, 130.
- Fletcher, 130.
- Whittle, 150.
- Newcomb, 160.
- Bacon, 172.
- Parkes, 174.
- Newton, 189.
- Owen, 202.
- Owen (*Buck and Co.*), 218.
- Campbell and Worstenholm (*Allen*), 215.
- Gedge (*Roelandt and Co.*), 217.
- Whittle, 223.
- Twentyman (*Shweet*), 227.
- Johnson (*Vin*), 232.
- Brough and Cox, 234.
- Webb, Timmins, and Brough, 242.
- Brown, Fellows, Jones, and Brown, 251.
- Massiaux, 254.
- Bennett, 257.
- Davies (*Louvrier*), 260.
- Richardson, 264.
- Bousfield (*Gustafsgon*), 268.
- Quinard, 270.
- James, 281.
- Townsend (*Sargent*), 282.
- Wickens (*Wickersham*), 289.
- Groucutt, 298.
- Parkes, 317.
- Whittle, 361.
- Mellor, 369.
- Huggett, 370.
- Gedge (*Falatieu*), 383.
- Lake (*Polsey*), 400.

Nail shanks for ornamental and other heads :

- Rowley, 98.
- Hogg, 104.
- Turner, 134.
- Henn and Haddon, 139.
- Stokes, 159.
- Le Souëf (*Schuberth*), 277.
- Davies (*Lambert*), 277.

Nails, machines for forging, compressing, forming, &c. :

- Clifford, 5.
- Finch, 6.
- Bennoch, 8.
- Tyndall, 23.
- Hancorne, 26.
- Ledsam and Jones, 27.
- Church, 28.
- Joyce, 29.

Nails, machines for, &c.—*cont.*

- Joyce, 30.
- Berry, 30.
- Fuller, 32.
- Cordes, 33.
- Slocum, 33.
- Cordes, 35.
- Slocum, 36.
- Prosser, 37,
- Stocker, 38.
- Pope, 44.
- Collier, 46.
- Poole, 54.
- Jackson, 55.
- Stocker, 56.
- Coates, 60.
- Newton, 63.
- Coates, 70.
- Walker, 71.
- Newton, 73.
- Collier, 76.
- Robertson, 76.
- De Meckenheim, 80.
- Lambert, 84.
- Poole, 85.
- Jacquin, 90.
- Hinks and Nicolle, 91.
- McLellan, 95.
- Brundage, 95.
- Rothera, 100.
- Carr, 103.
- Howden, 109.
- Bellford, 112.
- Fontainemoreau, 113.
- Glasgow, 113.
- Stansbury (*Barlow*), 115.
- Fontainemoreau, 121.
- Shanks, 128.
- Fontainemoreau, 135.
- Newton, 144.
- Whittle, 150.
- Newton, 152.
- Haile, 157.
- Newcomb, 160.
- Jossa, 165.
- Newton, 166.
- Norris and Westenholm, 167.
- Laurent, 171.
- Parkes, 174.
- Ward, 180.
- Barr, 181.
- Monnin, 186.
- Newton, 192.
- Till, 197.
- Owen, 202.
- Owen (*Buck and Co.*), 213.
- Clarini, 214.
- Whittle, 223.
- Till, 223.
- Norris and Till, 224.
- Norris and Till, 233.
- Brough and Cox, 234.
- Till, 239.
- Laurent, 239.
- Webb, Timmins, and Brough, 242.
- Blyth and Adair (Hood), 249.

Nails, machines for, &c.—*cont.*

Newton (*Mason*), 250.
Brown, Fellows, Jones, and Brown, 251.
Abel, 252.
Bousfield (*Gustafsgon*), 268.
Putnam, 275.
Southwood, 279.
Whittle, 286.
Whittle, 334.
Farmer and Turner, 344.
Whittle, 361.
Mellor, 369.
Newton (*Excelsior Nail Co.*), 387.
Bass, 397.

Nails of malleable iron. *See also* Annealing, &c.:

Wright, 179.
Bass and Bass, 304.

Nails and spikes adapted for clinching:

Cornforth and Andrews, 309.
Robinson, 345.
Newton (*McMurtry*), 364.

Nicking screw heads and ends, machines and apparatus for:

Todd, 5.
Colbert, 16.
Wright, 22.
Wright, 24.
Berry, 41.
Edmondson and Edmondson, 48.
Newton, 53.
Newton, 77.
Warren, 79.
De Meckenheim, 80.
Bower and Fortune, 88.
Newton, 92.
Warren and Walker, 94.
Monnin, 186.
Newberry, 194.
Viellard-Migeon, 200.
Breeden, 206.
Avery, 208.
Lamar (*Jarrin*), 230.
Jewsbury, 236.
Avery, 269.
Bousfield (*Harvey*), 324.

Nuts, and the processes employed in making them, are classified and placed under the following heads, viz.:—Expansible nuts; Nut blanks; Nut iron, preparing, rolling, compressing; Nuts (cast); Nuts, coating with metal; Nuts (compound); Nuts, punching; Nuts turning, shaping, finishing; Nuts and washers (made in one piece); Nuts and washers self-adjusting; Screw nuts; Tapping nuts.

Nut blanks; forging, forming:

Todd, 5.
Stocker and Downing, 40.
Griffith and Evers, 40.
Jackson, 55.
Ryder, 61.
Glasgow, 86.
Nicholson, 96.
Berry, 97.
Robinson, 107.
Glasgow, 113.
Porter, 115.
Bellford (*Wateron*), 117.
Marland, 119.
Greenwood, 120.
Jamieson, 124.
Shanks, 128.
Fletcher, 130.
Ross and Wilkes, 133.
Harfield, 137.
Grice, 140.
Newton, 142.
Bower, 146.
Chenot and Chenot, 147.
Flint, Wood, and Wood, 150.
Hall, 152.
Bower, 157.
Newton, 159.
Marrow, 163.
Watkins (*Cole*), 169.
Ward, 180.
Moate (*Gibbs*), 205.
Grice, 229.
Horton, 238.
Marsden, 248.
Parsons, 253.
Davies (*Taylor*), 262.
Grice, 289.
Watkins, 313.
Brooman (*Leger*), 315.
Reilly, 318.
Haseltine (*Chisholm*), 319.
Burdict, 323.
Brooman (*Glover and Shelton*), 326.
Spence (*Knight*), 327.
Bramwell, 329.
Waldenström, 330.
Davies, 335.
Haseltine (*Dewhurst*), 337.
Lewis, 358.
Burdict, 366.
Bonneville (*Dubuisson*), 370.
Bellhouse and Dorning, 378.
Bentall, 380.
Cooke, 390.

Nut blanks, &c.—*cont.*
  Bentall, 394.
  Watkins, 402.

Nut iron; machines and apparatus for preparing, rolling, compressing:
  Todd, 5.
  Stocker and Downing, 40.
  Griffiths and Evers, 40.
  Hall, 152.
  Brown, 184.
  Grice, 229.
  Grice, 289.
  Brooman (*Leger*), 315.
  Bramwell, 329.
  Burdict, 366
  Bonneville (*Dubuisson*), 370.
  Bentall, 380.

Nuts (cast):
  Onions, 91.
  Moate (*Gibbs*), 205.

Nuts, coating with metal:
  Bowser and Bowser, 294.

Nuts (compound):
  Haseltine (*Derby*), 288.
  Williams (*Gregory*), 393.

Nuts, punching the holes in:
  Harfield, 137.
  Grice, 140.
  Newton, 142.
  Flint, Wood, and Wood, 150.
  Hall, 152.
  Ward, 180.
  Bellhouse and Dorning, 378.

Nuts; turning, shaping, finishing, machines adapted for:
  Haley, 42.
  Bodmer, 51.
  Batho, 59.
  Glasgow, 86.
  Bellford, 122.
  Peak, 136.
  Harfield, 143.
  Vasserot (*Marchal and Oger*), 149.
  Hope, 164.
  Leigh (*Hartmann*), 221.
  Thompson, 388.
  Bentall, 394.
  Watkins, 402.

Nuts and washers (made in one piece);
  Coles, 317.

Nuts and washers (self-adjusting):
  Nicholson, 96.

Ornamental and fancy heads to nail shanks, tacks, pins, &c.:
  Prosser, 26.
  Manly, 88.
  Rowley, 98.
  Hogg, 104.
  Turner, 134.
  Henn and Haddon, 139.
  Parkes, 161.
  Frearson, 170.
  Schuberth, 228.
  Newton (*Bapterosses*), 241.
  Le Souëf (*Schuberth*), 277.
  Durand, 310.

Oxidation and corrosion of nails, screws, &c., prevention of:
  Glascott and Michell, 20.
  Newton (*Poleux*), 153.
  Dering, 244.
  Bousfield (*Perkins*), 392.

Pegs for boots and shoes. *See* Boots and shoes, &c.

Pipes, unions, and sockets; screwed and screwing:
  Stocker, 124.
  Russell, 193.
  Fuller and Davidson, 233.
  Penrose (*Peace*), 260.
  Stroud, 291.
  Russ, 310.

Pointing nails, bolts, screw-blanks, spikes:
  Clifford, 6.
  Willmore and Tonks, 11.
  Fuller, 32.
  Peak, 136.
  Horton, 238.
  Massiaux, 254.
  Smith, 273.
  Whittle, 286.
  Whittle, 290.
  Davies (*Louvrier*), 302.
  Watteeu (*Ryan*), 317.
  Whittle, 334.
  Saunders (*Saunders*), 338.
  Bayliss, 342.
  Mellor, 369.
  Lake (*Osborn*), 372.
  Fox (*Howard*), 376.
  Lake (*Polsey*), 400.

Polishing screws, nails, &c. *See also* Coating, &c.:
  Todd, 5.
  Ryland, 48.
  Barbette, 110.

Polygonal bolts:
  Law, 19.

Railway pins, spikes, bolts, keys. *See also* Split or slotted bolts, spikes, &c. :

Griffiths, 75.
De Meckenheim,
Johnson, 82.
McCormick, 102.
Hopper, 109.
Croisy, 110.
Hopper, 125.
Bridgewater, 126.
Sinclair, 145.
Adams, 147.
Hopper, 148.
Cochrane, 194.
Maclellan, 216.
Adams, 218.
Newton (*Bayley*), 230.
Brown, Fellows, Jones, and Brown, 251.
Richardson, 264.
Webster, 268.
Price, 276.
Livesey and Edwards, 311.
Watteeu (*Ryan*), 317.
Grice, 321.
Soul (*Gregory*), 329.
Richardson, 340.
Bayliss, 342.
Wilkes, 346.
Newton (*McMurtry*), 364.
Bruff, 368.
Bellhouse and Dorning, 378.
Parsons, 386.
Newton (*Reilley and Wiley*), 396.

Regulating and testing screws. *See* Machine for, &c.

Relief apparatus, signalling, protecting, regulating, driving, screw, nail, and bolt machines :

Johnson (*Fondu and Boin*), 178.
Johnson, 188.
Breeden, 206.
Twentyman (*Shweet*), 227.
Lane, 237.
De Bergue, 246.
Blyth and Adair (*Hood*), 249.
Galloway and Galloway, 293.
Paget, 350.
Ruppert, 376.

Reversing apparatus for screw-cutting and other machines :

Whitworth, 43.
Whitworth and Spear, 58.
Bodmer, 61.

Revolving die holders; machines for forging, &c., nails, bolts, spikes, and rivets fitted and working with :

Gilchrist, 16.
Church, 28.
Griffiths, 37.
Woodbridge, 89.
Elliott and Brown, 104.
Howden, 109.
Greenwood, 120.
Holford and Mason, 137.
Naylor, 141.
Brooman, 162.
Watkins, 163.
Grice, 175.
Barr, 181.
Monnin, 186.
Aspinall, 204.
Lane, 204.
Howden, 207.
Mennons (*Vergniais*), 214.
Jones, 234.
De Bergue, 246.
Jopling, 257.
Galloway and Galloway, 293.
Tannahill and Tannahill, 295.
Gossiaux, 305.
Bonneville (*Gauthier*), 306.
Hodgson and Woodifield, 307.
Peskett, 328.
Kennard, 341.
Leddicoat, 348.
Kennard, 353.
Waldenström, 354.
McDermott, 357.
Lake (*Osborn*), 373.
Bayliss, 385.
Watkins, 403.

Rivets are classified and placed under the following heads, viz. :—Boots and shoes, pegs, screws, rivets, &c.; Heading rivets; Rivets, machines for forging, &c.; Rivets for packing bands; Safety rivets; Split rivets; Twisted wire rivets.

Rivets; machines for or capable of forging, compressing, making :

Ledsam and Jones, 27.
Berry, 30.
Cordes, 33.
Cordes, 35.
Griffiths, 37.
Stocker, 38.
Stocker and Downing, 40.
Pope, 44.
Jackson, 55.

Rivets, &c.—*cont.*

Stocker, 56.
Galloway, Galloway, and Haley, 66.
Newton, 67.
Zander, 68.
Newton, 73.
Griffiths, 75.
De Meckenheim, 80.
Johnson, 82.
Glasgow, 86.
Bower and Fortune, 88.
Woodbridge, 89.
McLellan, 95.
Johnson, 98.
Arrowsmith, 101.
Griffiths, 101.
McCormick, 102.
Carr, 103.
Elliott and Brown, 104.
Griffiths, 106.
Robinson, 107.
Howden, 109.
Croisy, 110.
Glasgow, 113.
Bourseret, 118.
Greenwood, 120.
Fontainemoreau, 121.
Rothera, 129.
Wakefield, 129.
Ross and Wilkes, 133.
Holford and Mason, 137.
Grice, 140.
Naylor, 141.
Bower, 146.
Elliott, 155.
Watkins, 156.
Bower, 157.
Brooman, 162.
Marrow, 163.
Watkins, 163.
Norris and Worstenholm, 167.
Archer, 172.
Grice, 175.
Wilson, 176.
Wilson, 177.
Johnson (*Fondu and Boin*), 178.
Ward, 180.
Barr, 181.
Monnin, 186.
Johnson, 188.
Newton, 192.
Newton, 199.
Viellard-Migeon, 200.
Aspinall, 204.
Howden, 207.
Newton (*Allen*), 212.
Mennons (*Vergniais*), 214.
Brooman (*Johnson*), 215.
Parfitt, 219.
Twentyman (*Shweet*), 227.
Jones, 234.
Brough and Cox, 234.
Laurent, 239.
De Bergue, 246.
Parsons, 253.
Jopling, 257.

Rivets, &c.—*cont.*

Iles, 271.
Rigollot, 273.
Marsh, 285.
Galloway and Galloway, 293.
Tannahill and Tannahill, 295.
Grice, 297.
Satchwell, Ashford and Harrison, 303.
Toy, 304.
Gossiaux, 305.
Bonneville (*Gauthier*), 306.
Hodgson and Woodifield, 307.
Cornforth and Andrews, 309.
Bebbington and Hampson, 309.
Watkins, 313.
Darwen and Haddon, 314.
Watteeu (*Ryan*), 317.
Lewis, 327.
Peskett, 328.
Whittle, 334.
Davies, 335.
Kennard, 341.
Farmer and Turner, 344.
Leddicoat, 348.
De Bergue, 351.
Finch, 352.
Kennard, 353.
Waldenström, 354.
McDermott, 357
Lewis, 358.
Wakefield, 359.
York, 365.
Newton (*White and Butterworth*), 365.
Andrews, 372.
Lake (*Osborn*), 373.
Linford, 375.
Fletcher, 377.
Cooke, 390.
Newton (*Reilley and Wiley*), 396.
Watkins, 403.

Rivets for securing packing bands:

Fullarton, 308.
Bebbington and Hampson, 309.
Van Hees, 315.

Rolling. *See* Bolt, spike, and rivet iron, &c.; Nail iron, &c.; Nut iron, &c.

Rose-headed nails:

Till, 223.
Webb, Timmins and Brough, 242.

Roughs:

Coates, 7.
Gowing, 203.

Safety rivets:

Zander, 68.

Screws, and the apparatus and machines employed in making them, are classified and placed under the following heads, viz.: — Casting and cast screws; Encasing screws, &c.; Fixing threads on screws; Hollow screws; Metallic compositions for making or coating screws, &c.; Nicking screw heads; Pointing screw blanks; Screw blanks; Screw bolts; Screw boxes; Screw caps; Screw dowels; Screw eyes; Screw and screw-bolt heads, forming, shaping, finishing; Screw nuts; Screw pegs and rivets; Screws and screw-threads, forming, cutting, finishing; Screw cutting machines; Screw treenails; Screws with bradawl points; Screws with centerbit points; Screws with gimblet points; Screws for horse-shoes; Screws (internal); Screws for making minute divisions; Screws of plastic composition; Screws for wood; Screws (self-countersinking):

Screw blanks:
- Gilchrist, 16.
- Colbert, 16.
- Church, 18.
- Woolley, 19.
- Wright, 22.
- Tyndall, 23.
- Wright, 24.
- Ledsam and Jones, 27.
- Berry, 30.
- Cordes, 33.
- Bethell, 34.
- Cordes, 35.
- Griffiths, 37.
- Stocker, 38.
- Berry, 41.
- Edmondson and Edmondson, 48.
- Prosser, 51.
- Newton, 53.
- Newton, 67.
- Newton, 73.
- Newton, 76.
- Newton, 77.
- De Meckenheim, 80.

Screw blanks—*cont.*
- Newton, 83.
- Woodbridge, 89.
- Newton, 92.
- Brundage, 95.
- Rothera, 100.
- Arrowsmith, 101.
- Elliott and Brown, 104.
- Howden, 109.
- Croisy, 110.
- Bourseret, 118.
- Rothera, 129.
- Ross and Wilkes, 133.
- Grice, 140.
- Newton, 149.
- Bower, 157.
- Norris and Worstenholm, 167.
- Grice, 175.
- Ward, 180.
- Barr, 181.
- Monnin, 186.
- Viellard-Migeon, 200.
- Breeden, 206.
- Cook, 220.
- Twentyman (*Shweet*), 227.
- Jones, 234.
- Laurent, 239.
- Jopling, 257.
- Avery, 269.
- Whittle, 334.
- Lewis, 358.
- Watkins, 403.

Screw bolts:
- Whitworth, 43.
- McCormick, 102.
- Robinson, 107.
- Porter, 115.
- James, 119.
- Dray, 122.
- Bellford, 127.
- Wakefield, 129.
- Moate (*Gibbs*), 205.
- Sellers, 211.
- Adams, 218.
- Leigh (*Hartmann*), 221.
- Henry, 226.
- Stevens (*Derenne*), 238.
- Palliser, 294.
- Reilly, 318.
- Newton (*Sellers and Sellers*), 355.
- Harvey and Harvey, 356.
- Tangye, 361.
- Bruff, 368.
- Deacon, 381.
- Parsons, 386.
- Paget, 387.
- Chalmers, 389.

Screw boxes:
- Todd, 5.

Screw caps:
- Ellington, 99.
- Newton, 169.
- Limet, 379.

Screw dowels:
Coles, 256.

Screw drivers:
Newton (*Ayres*), 349.

Screw eyes:
Greenfield, 332.

Screw and screw-bolt heads, forming, shaping, finishing:
Wyatt and Wyatt, 1.
Todd, 5.
Colbert, 16,
Woolley, 19.
Berry, 41.
Woodyatt and Harrison, 45.
Ryland, 48.
Edmondson and Edmondson, 48.
Newton, 53.
Newton, 67.
Newton, 77.
Bower and Fortune, 88.
Newton, 92.
Warren and Walker, 94.
Vasserot (*Marchal and Oger*), 149.
Slater and Smith, 178.
Monnin, 186.
Viellard-Migeon, 200.
Cook, 220.
Horton, 238.
Avery, 269.
Stroud, 291.
Saunders, 312.
Bousfield (*Harvey*), 324.
Avery, 325.
Linford, 375.
Brooman (*Titus*), 381.
Thompson, 388.
Williams (*Gregory*), 393.

Screw and other keys:
Warren and Walker, 94.
Adams, 218.
Wilson, 255.
Grice and Bennett, 321.
Bellhouse and Dorning, 378.

Screw nuts. *See also* Nuts:
Dimpfel (*Goddard*), 145.
Hope, 164.
Haseltine (*Derby*), 288.

Screw pegs. *See* Boots and shoes.

Screws and screw threads, forming, cutting, finishing:
Wyatt and Wyatt, 1.
Harrison and Atherton, 3.
Todd, 5.
Colbert, 16.
Todd, 17.
Wright, 22.

Screws, &c.—*cont.*
Tyndall, 23.
Whitworth, 31.
Bethell, 34.
Berry, 39.
Berry, 41.
Woodyatt and Harrison, 45.
Hillard, 46.
Ryland, 48.
Edmondson and Edmondson, 48.
Newton, 53.
Batho, 59.
Bodmer, 61.
Newton, 67,
Newton, 77.
Newton, 83.
Poole, 85.
Bower and Fortune, 88.
Brooman, 90.
Jacquin, 90.
Newton, 92.
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Hertford (*Literary and Scientific Institution*).
Heywood (*Mechanics' Institute*).
Holbeck (*Mechanics' Institution*).
Hollingwood (*Working Men's Club*).
Holt, Norfolk (*Literary Society*).
Holywell Green (*Mechanics' Institution*).
Huddersfield (*Mechanics' Institution*).
Hull (*Church Institute*).
——— (*Literary, Scientific, and Mechanics' Institute*).
——— (*Lyceum Library*).
——— (*Royal Institution, Albion Street*).
——— (*Young People's Institute*).
Huntingdon (*Literary and Scientific Institution*).
Inverness (*Working Men's Club*).
Kendal (*Christian and Literary Institute*).
——— (*Working Men's Institute*).
Kidderminster (*Mechanics' Institute*).
Lancaster (*Mechanics' Institute and School of Science*).
Lee, Kent (*Working Men's Institution*).
Leeds (*Church Institute*).
——— (*Library*).
——— (*Mechanics' Institution and Literary Society*).
——— (*Philosophical and Literary Society*).
——— (*Working Men's Institute*).
——— (*Young Men's Christian Association*).
Leek, Staffordshire (*Literary and Mechanics' Institution*).
Leicester (*Law Society*).
——— (*Young Men's Christian Association*).
Leighton Buzzard (*Working Men's Mutual Improvement Society*).
Leith (*Mechanics' Subscription Library*).
Lewes (*Fitzroy Memorial Library*).
——— (*Mechanics' Institute*).
——— (*School of Science and Art*).
Lincoln (*Mechanics' Institute*).
Liverpool (*Institute*).
——— (*Mechanics' Institute*).
——— (*Medical Institution*).
——— (*Polytechnic Society*).
Llanelly (*Chamber of Commerce and Reading Room*).
London (*Beaumont Institute, Mile End*).
——— (*Bedford Working Men's Institute, Spitalfields*).
——— (*Birkbeck Institution, Southampton Buildings, Chancery Lane*).
——— (*Bow Common Working Men's Club, Devon's Road, Bow Common*).
——— (*Christchurch Working Men's Club, New Street, Lark Hall Lane, Clapham*).
——— (*Clerkenwell Club, Lower Rosoman Street*).
——— (*Holloway Working Men's Club and Institute, Holloway Road*).
——— (*Literary and Scientific Society, Wellington Street, Islington*).
——— (*Literary and Scientific Institution, Walworth*).
——— (*St. James and Soho Working Men's Club, Rupert Street, Soho*).
——— (*St. Mary Charterhouse Working Men's Club, Golden Lane*).
——— (*South London Working Men's College, Blackfriars Road*).
——— (*Southwark Working Men's Club, Broadwall, Stamford Street*).
——— (*Working Men's Club, Brixton Hill*).
——— (*Working Men's Club, St. Mark's, Victoria Docks*).
——— (*Working Men's Club and Institute, Battersea*).
——— (*Working Men's Club and Institute Union, Strand*).
——— (*Working Men's College, Great Ormond Street*).
Loughborough (*Working Men's Club and Institute*).
Lye (*Institution*).
Lymington (*Literary Institute*).
Madeley, Shropshire (*Anstice Memorial, Workmen's Club and Institute*).
Maidstone (*St. Paul's Literary Institute*).
Maldon, Essex (*Literary and Mechanics' Institute*).
Manchester (*Ancoats Branch Free Library*).
——— (*Athenæum*).
——— (*Campfield Free Lending Library*)
——— (*Chorlton and Ardwick* Branch Free Library).

Manchester (*Hulme Branch Free Library*).
———— (*Law Library*).
———— (*Mechanics' Institution*).
————(*NaturalHistoryMuseum, Peter Street*).
———— (*Owen's College*).
———— (*Portico Library, Mosley Street*).
———— (*Rochdale Road Branch Free Library*).
———— (*Royal Exchange Library*).
Mansfield (*Co-operative Industrial Society*).
———— (*Mechanics', Artizans', and Apprentices' Library*).
Marlborough (*Reading and Mutual Improvement Society*).
Melksham (*Mutual Improvement Society*).
Melton Mowbray (*Literary Institute*).
Mere, near Bath (*Literary Association*).
Merthyr-Tydfil (*South Wales Institute of Engineers*).
Middlesborough (*Iron and Steel Institute*).
———— ———— (*Mechanics' Institution*).
Middlewich (*Literary and Scientific Institution*).
Modbury (*Mechanics' Institution*).
Mossley (*Mechanics' Institute*).
Newark (*Mechanics' Institute*).
Newbury (*Literary and Scientific Institution*).
Newcastle-upon-Tyne (*Mechanics' Institution*).
———— ———— (*Working Men's Club*).
New Mills, near Stockport (*Mechanics' Institute*).
Newport, Isle of Wight (*YoungMen's Society and Reading Room*).
Northampton (*Mechanics' Institute*).
Nottingham (*Free Library*).
———— (*Mechanics' Institution*).
———— (*Subscription Library, Bromley House*).
Odiham (*Mechanics' Institution*).
Oldham (*Analytic Literary Institution*).
——— (*Mechanics' Institution, Werneth*).
Ormskirk (*Public Library*).
Oswestry (*Institute*).
Over, Cheshire (*Working Men's Institute*).
Oxford (*North Oxford Working Men's Club*).
Patricroft (*Mechanics' Institution*).
Pembroke Dock (*Mechanics' Institute*).
Pendleton (*Mechanics' Institution*).
Penryn (*Working Men's Club and Reading Room*).
Perth (*Mechanics' Library, High Street*).
Peterborough (*Mechanics' Institution*).
Plymouth (*Working Men's Institute*).
Poole (*Literary and Scientific Institution*).
——— (*Mechanics' Institute*).
Portsea (*Athenæum and Mechanics' Institution*).
Preston (*Institution for the Diffusion of Knowledge*).
Rawtenstall (*Mechanics' Institution*).
Reigate (*Mechanics' Institution*)
Retford (*Literary and Mutual Improvement Society*).
Richmond (*Working Men's College*).
Rotherham (*Rotherham and Masbro' Literary and Mechanics' Institute*).
Royston (*Institute*).
Ryde, Isle of Wight (*Literary and Scientific Institution*).
———— ———— (*Philosophical and Scientific Society*).
Saffron Walden (*Literary and Scientific Institution*).
St. Just (*Institution*).
St. Leonard's (*Mechanics' Institution*).
Salford (*Working Men's Club*).
Saltaire (*Literary Institute*).
Selby (*Mechanics' Institute*).
Sevenoaks (*Literary and Scientific Institution*).
Shaftesbury (*Literary Institution*).
Sheffield (*Branch Free Library*).
——— (*BrightsideBranchLibrary*).
——— (*Literary and Philosophical Society, School of Arts*).
——— (*Mechanics' Institution*).
Sidmouth (*Mechanics' Hall*).
Skipton, Yorkshire (*Mechanics' Institute*).
Slough (*Mechanics' Institute*).
Smethwick, Staffordshire (*Library, Reading Room, and Literary Institute*).
Southampton (*Hartley Institution*).
———— (*Polytechnic Institution*).
———— (*Workmen's Hall*).
Southport (*Athenæum*).
South Shields (*Working Men's Institute and Club*).
Southwell (*Literary Institution*).
Spalding (*Mechanics' Institute*).
——— (*Christian Young Men's Association*).
Staines (*Literary and Scientific Institution*).
——— (*Mechanics' Institute and Reading Room*).
Stalybridge, Cheshire (*Mechanics' Institution*).
Stamford (*Institution*).
Stourbridge (*Associated Institute*).
———— (*Church of England Association*).
———— (*Iron Works Reading Room and Library*).
———— (*Mechanics' Institution*).
———— *Working Men's Institute*).
Stratford (*Working Men's Hall*).
Sudbury, Suffolk (*Literary and Mechanics' Institute*).
Sunderland (Working Men's Club).

Swansea (*Royal Institution of South Wales*).
——— (*Working Man's Institute*).
Tavistock (*Mechanics' Institute*).
——— (*Public Library*).
Thornton, near Bradford (*Mechanics' Institute*).
Thornton Heath, Croydon (*Workmen's Club*).
Todmorden (*Mechanics' Institution*).
Truro (*Cornwall County Library*).
——— (*Institution*).
——— (*Royal Institution of Cornwall*).
Tunbridge (*Literary and Scientific Institute*).
——— (*Mechanics' Institute*).
Tunbridge Wells (*Mechanics' Institution*).
——— (*Society of Literature and Science*).
Turton, near Bolton (*Chapel Town Institute*).
Tynemouth (*Free Public Library*).
Ulverston (*Temperance Hall*).
Uttoxeter (*Mechanics' Literary Institute*).
Wakefield (*Mechanics' Institute*).
Wallingford (*Free Library and Literary Institute*).
Walsham-le-Willows, Suffolk (*Institute*).
Ware (*Institute*).
Warminster (*Athenæum*).
Watford (*Literary Institute*).
Wells, Somerset (*Mechanics' Institution, Grove Lane*).
——— (*Young Men's Society*).
Wendover (*Literary Society*).
Whaleybridge (*Mechanics' Institute*).
Whitby (*Institute*).
——— (*Museum*).
——— (*Subscription Library*).
Whitehaven (*Mechanics' Institute*).
——— (*Working Men's Reading Room*).
Whitstable (*Institute*).
Wilton (*Literary Institute*).
Winchester (*Mechanics' Institution*).
Wisbeach (*Mechanics' Institute*).
Witham (*Literary Institution*).
Wolverhampton (*Law Library*).
——— (*Library*).
Wolverton (*Institute*).
Woodbridge (*Literary and Mechanics Institute*).
——— (*Working Men's Hall*).
Worcester (*Railway Literary Institute*).
——— (*Workman's Hall*).
Workington (*Mechanics' Institution*).
Yeovil (*Mutual Improvement Society*).
York (*Church Institute*).
——— (*Institute of Popular Science, &c.*)
——— (*Railway Library*).

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Ennis (*Public Library*).
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Ipswich (*Mechanics' Institute, Tavern Street*).
Kew (*Library of the Royal Gardens*).
Kington, Herefordshire (*Reading Institute*).
Leominster (*Literary Institute*).
London (*House of Lords*).
——— (*House of Commons*).
London (*Hon. Soc. of Gray's Inn*).
——— (*Hon. Soc. of Inner Temple*).
——— („ „ *Lincoln's Inn*).
——— („ „ *Middle Temple*).
——— (*Aeronautical Society*).
——— (*Athenæum Club, Pall Mall*).
——— (*British Horological Institute*).
——— (*General Post Office*).
——— (*Institution of Civil Engineers*).
——— (*Odontological Society*).
——— (*Royal Society*).
——— (*United Service Museum*).
Manchester (*Literary and Philosophical Society, George Street*).
——— (*Mechanics' Institution, David Street*).
Newcastle-upon-Tyne (*North of England Institute of Mining Engineers*).
Oxford (*Bodleian Library*).
Stretford, near Manchester (*Mechanics' Institute*).
Swindon, New (*Mechanics' Institute*).
Tamworth (*Library and Reading Room, George Street*).
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———— Smithsonian Institute, Washington.
————Wabash College, Indiana.
———— Young Men's Christian Association, Scranton, Pennsylvania.

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